

# FLIGHT

*The*  
AIRCRAFT  
ENGINEER  
&  
AIRSHIPS

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER

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## Flight

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## DIARY OF FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list:—

- April 23.... Visit to National Physical Laboratory, Teddington. Inst. Ae. E.  
April 25.... Aero Golfing Society Team Match, Oxhey Golf Club.  
May 31–June 9 Third Czecho-Slovak International Aeronautical Exhibition, Prague  
June 15.... Gordon Bennett Balloon Race, Belgium.  
June 21.... F.A.I. Conference Opens, Paris.  
July 24–Aug. 10 Tour de France for Light 'Planes.  
Aug. 4.... Aerial Derby at Lympne  
Sept. 8–13 Light 'Plane Competitions at Lympne

## INDEX FOR VOL. XV.

The Index for Vol. XV of FLIGHT (January to December, 1923) is now ready, and can be obtained from the Publishers, 36, Great Queen Street, Kingsway, W.C. 2. Price 1s. per copy (1s. 1d. post free).

## EDITORIAL COMMENT.



### Aviation in Japan

IN many ways one of the most generally interesting papers read before the Royal Aeronautical Society for a long time, we have thought it useful to publish lengthy extracts from the lecture given by Colonel the Master of Sempill before that society on April 3. The British Aviation Mission to Japan, it will be seen, has evidently been a great success from every point of view, and cannot fail to have done a great deal of good, not only in strengthening the friendly relations between the two nations, but also in affording the Japanese an opportunity of becoming acquainted with a number of different types of British aircraft and aero engines. That the impression created was favourable cannot be doubted, and thus the visit of the mission may easily do a great deal of good in establishing goodwill and enhancing British prestige. That being undeniably so, there is all the more reason to pay the very closest attention to Colonel Sempill's introductory remarks, where, after mentioning that application was made for the loan of a British Service Mission in 1920, he states that:—

"Several Departments of State had a voice in such a matter, and a decision was long delayed. From the Japanese aspect this was serious, particularly as no indication was given that the request would be acceded to at all. Eventually a reply was sent, regretting that the British Government was not in a position to render the assistance required, mainly on the grounds of extreme shortage of personnel. At this time the Japanese authorities, perturbed at the delay, were seriously considering the advisability of applying elsewhere, and we must bear in mind that a French Aviation Mission had already been dispatched to Japan for the purpose of re-organising the Military Air Service."

The lecturer then went on to say that, in spite of the unwillingness of the British authorities to help, the Japanese were so impressed by the pre-eminence of British naval aviation that they continued their efforts, and succeeded in getting a British Aviation Mission to visit Japan without official assistance.

Taken in conjunction with Colonel Sempill's remarks in the concluding paragraph of his lecture, this statement is significant, and should be taken seriously to heart by those responsible for British foreign aviation policy. The concluding remarks of Colonel Sempill's lecture ran as follows: "The policy to be adopted when friendly powers ask for assistance in the formation or reformation of their air services has been much discussed, but no definite plan seems to have been followed; in fact, violent extremes are found. I venture to submit that had those in authority here in the past been more sympathetic, the sphere of British influence in aeronautical matters could have been vastly extended. Our aircraft and equipment generally continue to prove their superior qualities, the technique of flying is more highly developed here than elsewhere, and our methods of construction ensure the maximum of safety and durability, and it is for these and other reasons that foreign powers turn to us. Should they not, therefore, be welcomed and assisted officially to a reasonable extent, otherwise they will very naturally seek the aid of other countries more sympathetic to their needs, as has often been the case in the past."

Taken in conjunction with the information contained in the body of his paper, the case has been so admirably put by Colonel Sempill that we do not feel there is anything we could usefully add.

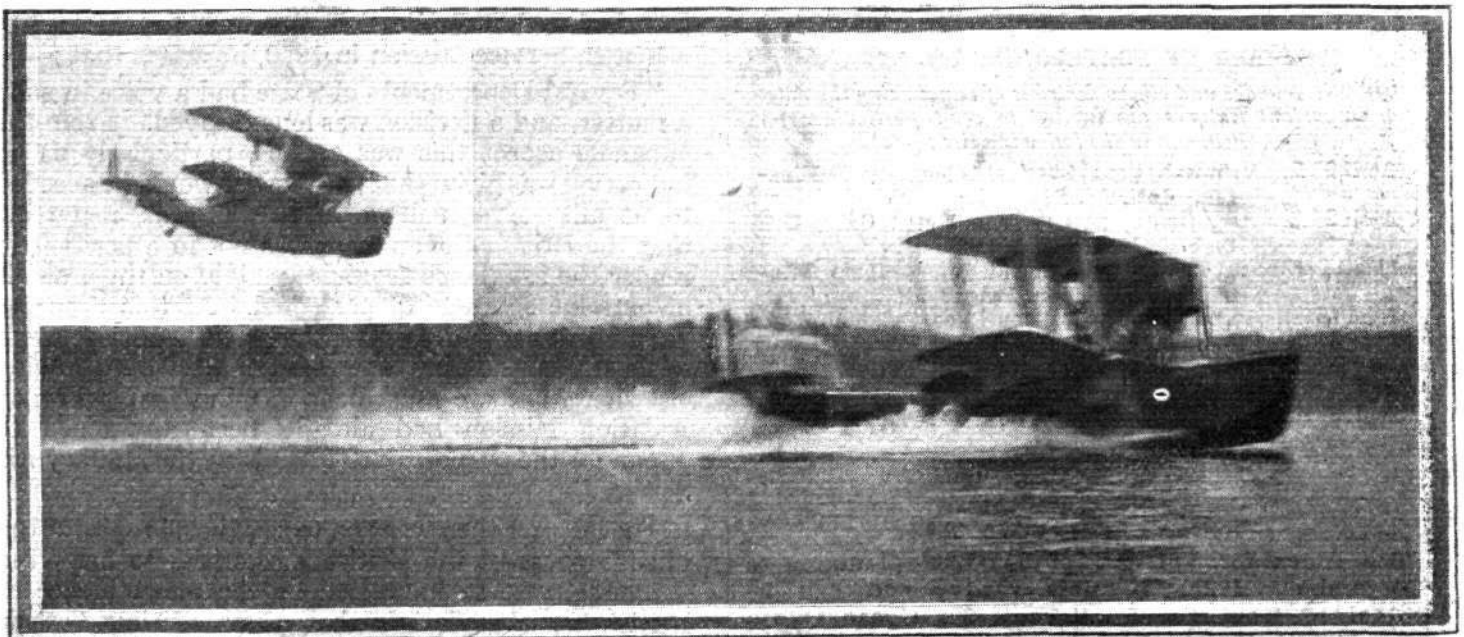
The section of the paper dealing with the behaviour of the various types of machines and engines under the trying climatic conditions will be read with special interest, and it is worthy of note that Colonel Sempill expresses the opinion that, owing to the dampness of climate all-metal aircraft will possess very definite advantages.

**Round-  
the-World  
Flights**

So far but scant luck has attended the efforts of the British and American crews now attempting to circle the globe by air. A cracked crank-case has brought the Vickers "Vulture" down on a lake in Corfu, and various minor troubles have prevented the American Army fliers from getting beyond British Columbia. Lest it should be thought that a breakage such as that which occurred to the engine of the

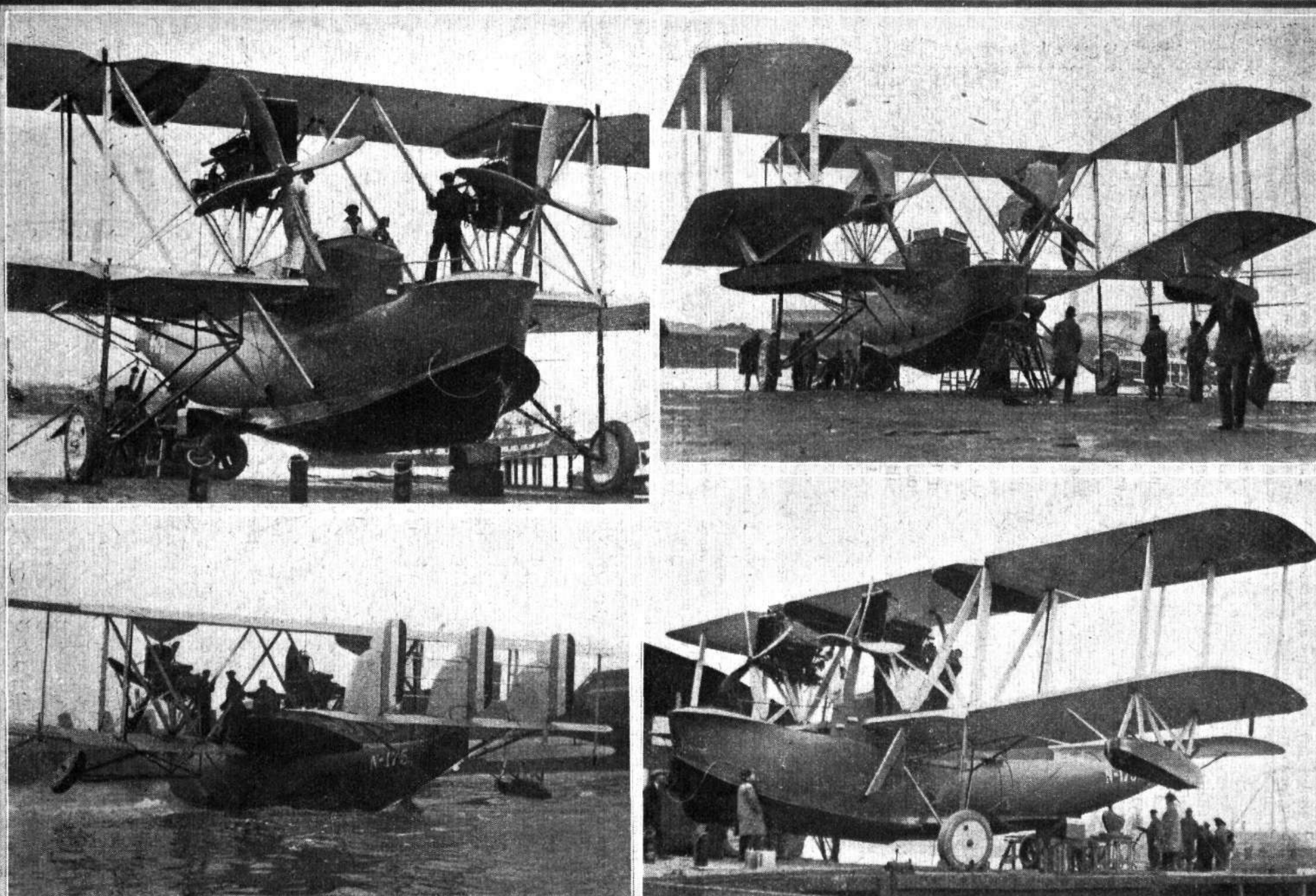
British machine is necessarily detrimental to the reputation of the Napier "Lion," it must be pointed out that, so far as we are aware, this is the first time on record that such a fracture has been known to occur, and that the "Lion" has established for itself an enviable reputation for reliability, not only on civilian but also on service machines, abroad no less than at home. The whole trouble may easily have been due to a small crack or flaw in the casting, which it was not possible to discover, and which spread during the journey. It should be remembered that most atrocious weather was met with nearly all the way out to Corfu, and this probably meant running the engine all out the whole time, especially as the machine was fairly heavily loaded. All who were present at the start of the flight from Calshot were unanimous in admiring the note of the "Lion," and many were the remarks made concerning the beautiful tuning-up and perfectly smooth and even running as the machine passed overhead "outward bound." It would appear that the whole thing is just a case of bad luck, and it is more than likely that, after such a troublesome beginning, the rest of the flight will go through without further serious trouble.

The American crews appear to have had difficulties in "getting unstuck" owing to the heavy loads of petrol carried for the flight, and, as an indirect result of this, minor troubles arose, such as damaged propeller tips, punctured floats, etc. Nevertheless, they appear to have got away from Seattle at last and to have arrived at Prince Rupert, British Columbia. At this place one of the machines is reported to have made a bad landing, and to have damaged some under-carriage struts. Repairs will be made, and it seems likely that the two crews will be starting again approximately even, some time next week. Up to the present they have covered nearly equal distances—the Americans about 1,300 and the MacLaren expedition about 1,500 miles. Thus there is still the element of a race in the two attempts, and it will be interesting to watch developments during the next week or two. The British crew has a fairly simple journey immediately ahead, while the Americans are approaching one of the most difficult stages of the whole flight.



THE NEW SUPERMARINE AMPHIBIAN FLYING BOAT: View of the machine taking off and, inset, in the air.





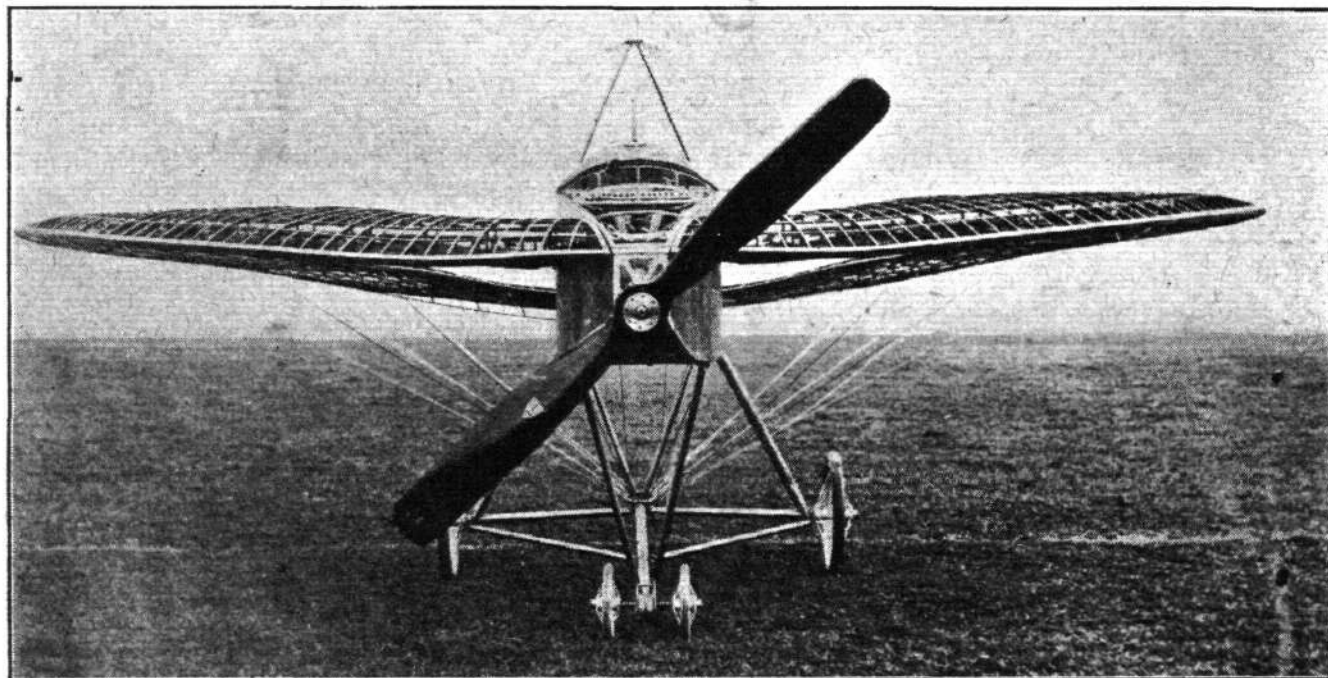
**A NEW SUPERMARINE AMPHIBIAN FLYING BOAT:** This machine, fitted with two Rolls-Royce "Eagle" engines, has been built for the Air Ministry, and it is not permissible to give technical details. The main features of the design will, however, be evident from the illustrations. Capt. Biard took the machine out recently, and, after a short taxiing test which proved the machine to be satisfactory, he took off and carried out a flying test of 45 minutes' duration. An unusual feature of the design is the raised, or "coach-roof" cabin top. The high flaring bows should render the boat capable of riding out quite a heavy sea.

# THE "ANNULAR" TYPE OF AEROPLANE

THE process of flying the modern aeroplane has been described as "forcing a petrified ornithopter through the air." Whether or not the expression does adequately define flying as we know it today, it is not altogether inept, and, after all is said and done, that is practically what we are doing. That great progress has been made in this way cannot be denied, and

explored, and whether it is really safe to assume that no other form of heavier-than-air craft gives any promise than the aeroplane of today and, possibly, the helicopter of tomorrow.

It is by no means always unprofitable to look back, and as an opportunity has been afforded us of describing some early experiments that have hitherto been surrounded by a con-

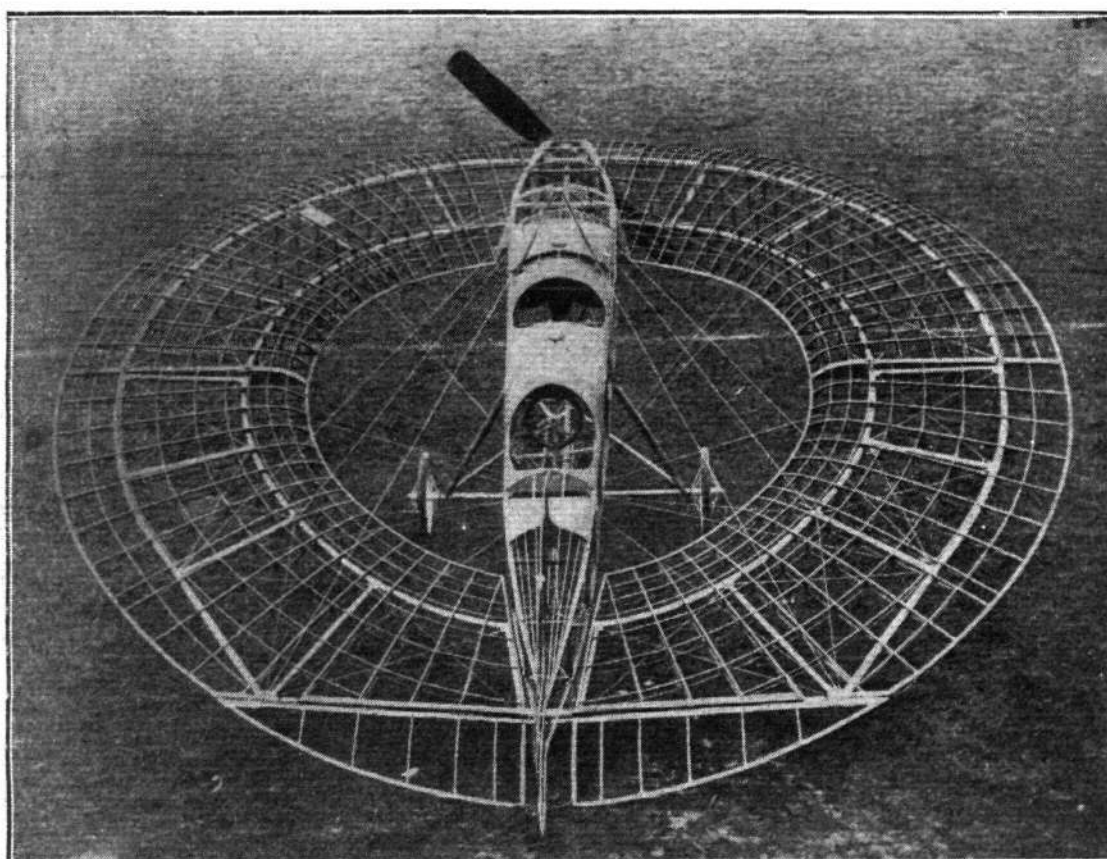


CEDRIC LEE No. 1 machine. Front view.

recent light 'planes have demonstrated that extraordinarily good efficiencies are obtainable with the "petrified ornithopter." For all that, it is by now fairly well agreed that as regards efficiency we cannot hope to progress very much farther. Improvement there will be, certainly, but there is no reason to expect other than relatively small progress. That being so, the question not unnaturally arises whether we can be quite certain we are on the right track: whether it may not be just possible that other avenues should be ex-

siderable amount of secrecy, we have thought it of interest to do so in the following notes. Quite apart from the question of future application of the experience gained during these experiments, the tests and experiments themselves, being considerably out of the common, are of interest, the more so as they have never really been thoroughly dealt with, at least not in modern times.

The experiments to which we refer date back to 1911, and were continued over a period of some three or four years,

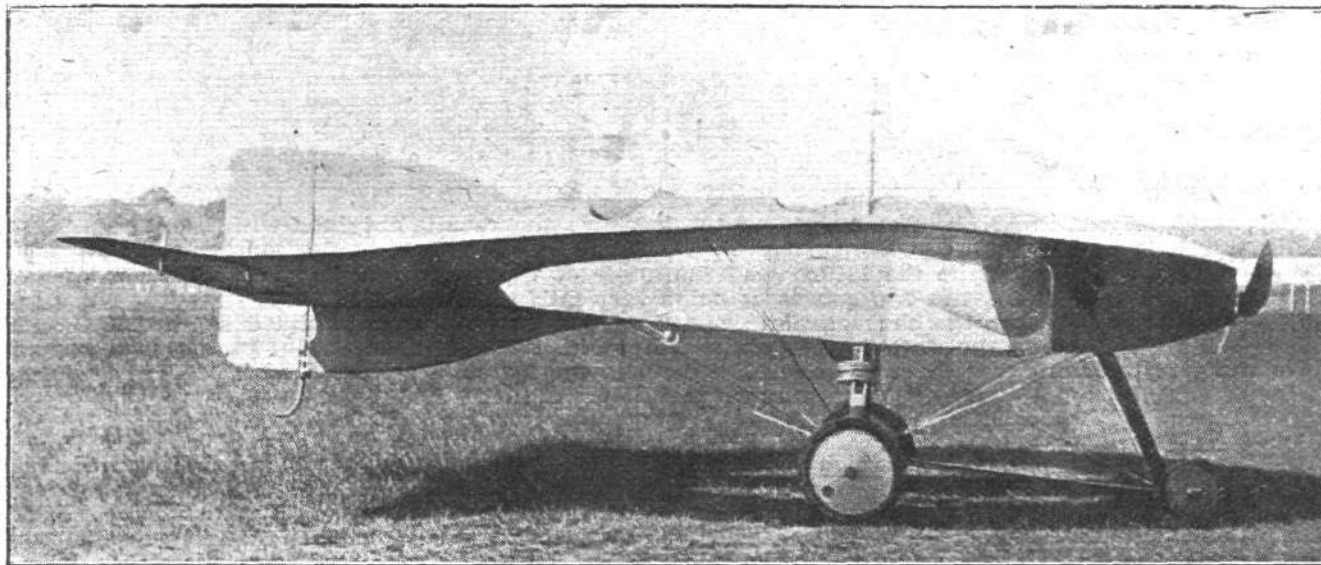


CEDRIC LEE No. 1 power-driven machine from above. This photograph gives a good idea of the wing structure.



*i.e.*, up to the outbreak of war. The subject of the experiments was a most unorthodox wing-form in which the lifting surfaces were circular in plan, with a circular piece cut out of the centre so as to leave a wing of annular shape. This wing-form was originated by Mr. G. J. A. Kitchen, who has since won fame with his rudder for power-driven ships, about 1910 or so, and the patents were purchased, in 1911, by the late Mr. Cedric Lee, who engaged Mr. Tilghman Richards to put the ideas into practical workable shape. A biplane, which

coincidence this was not discovered while the machine was flying with engine on, as the thrust-resistance couple exactly cancelled the weight-lift couple. The machine was reconstructed and the trim altered. During 1913 a number of flights were made by Gordon England, Percival and Gordon Bell. The second machine came to grief owing to the temporary elevator breaking away and jamming "hard down" at about 800 ft. When about 40 ft. from the ground the air pressure broke off the jammed elevator and the machine

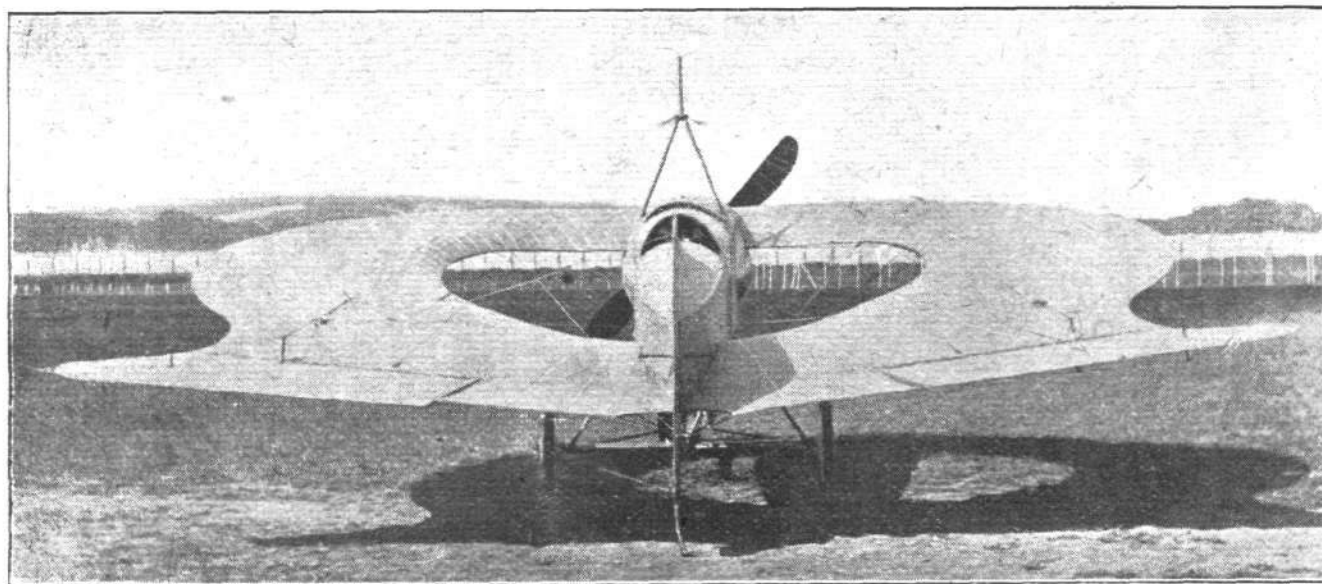


Side view of Cedric Lee machine No. 3.

had already been constructed by Mr. Kitchen and was fitted with a 50 h.p. Gnome engine, was experimented with in 1911, but was wrecked by a gale blowing down the hangar. Attention was then turned to model gliders and full-size man-carrying gliders, with which latter many flights were made during 1911-12. The scene of the gliding tests was laid among the Westmoreland hills, and glides were made in very strong winds. In 1912 the work was transferred to London, and early in the following year to Shoreham. In the meantime Mr. Tilghman Richards had constructed at the East London College a 2-ft. wind tunnel, and in this a series of very thorough experiments were carried out on scale models of various sections, but all of circular, or annular, plan form. Reference to the results obtained will be made later.

righted itself and pancaked to the ground, Gordon Bell escaping with a severe shaking.

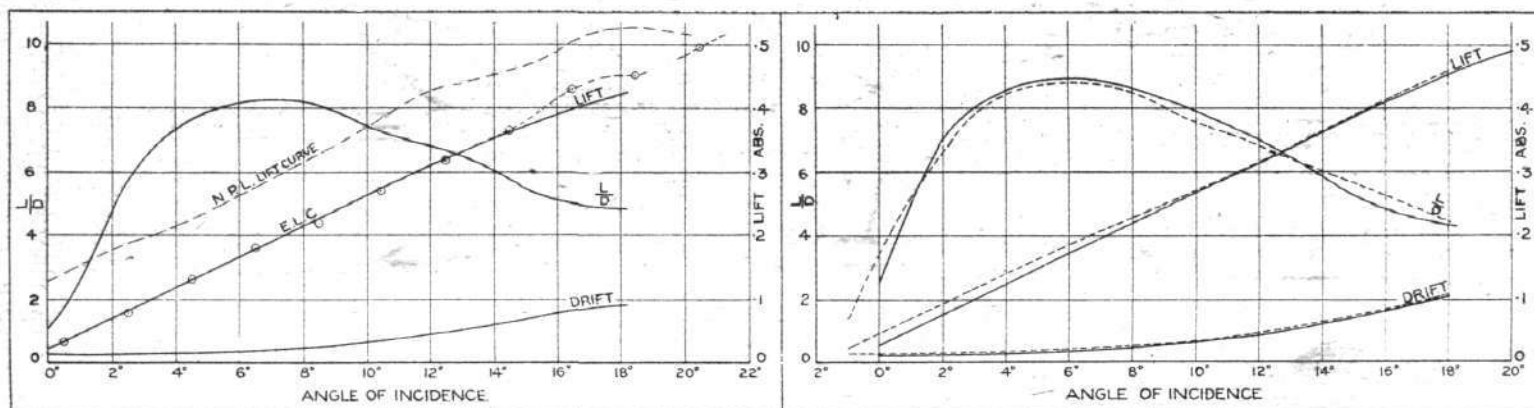
A third machine was then built, using the same 80 h.p. Gnome and the same long extension shaft to the propeller. In No. 3, shown in two of the accompanying photographs, the undesirable features of Nos. 1 and 2 were eliminated, and the chief fault of these, excessive lateral stability due to dihedral angle, was avoided by having no dihedral. Gordon Bell flew this machine frequently from the beginning of 1914 to the outbreak of war. He demonstrated it before Mr. Winston Churchill and Lord French, who were much interested. Later on Mr. Cedric Lee, who was not a pilot, took the machine up, but landed it in the River Adur. Further experimental work was then abandoned, as the War called for concentration of



Rear view of Cedric Lee machine No. 3.

At Shoreham designs were carried out and a machine constructed to Mr. Tilghman Richards' design, and a Gnome engine of 80 h.p. was fitted. This machine was flown by Mr. Gordon England, who flew it round a large circuit without previous taxiing. While the engine was running all went well, the machine behaving normally. In coming in to land, however, the engine stopped, and the machine got out of control and crashed. It was found that the cause was faulty weight distribution, the machine being tail heavy. By a

effort in other directions. It is of interest to record, however, that during the experiments with the three power-driven machines some 11,000 miles were flown, totalling something like 128 hours in the air. The Shoreham machines, apart from their unusual shape, were interesting in that the only lateral control provided was the differential movement of the elevator flaps. It seems probable that the actual effect was to reassure the pilots rather than any real lateral controllability, as the flaps could not have been very effective in their



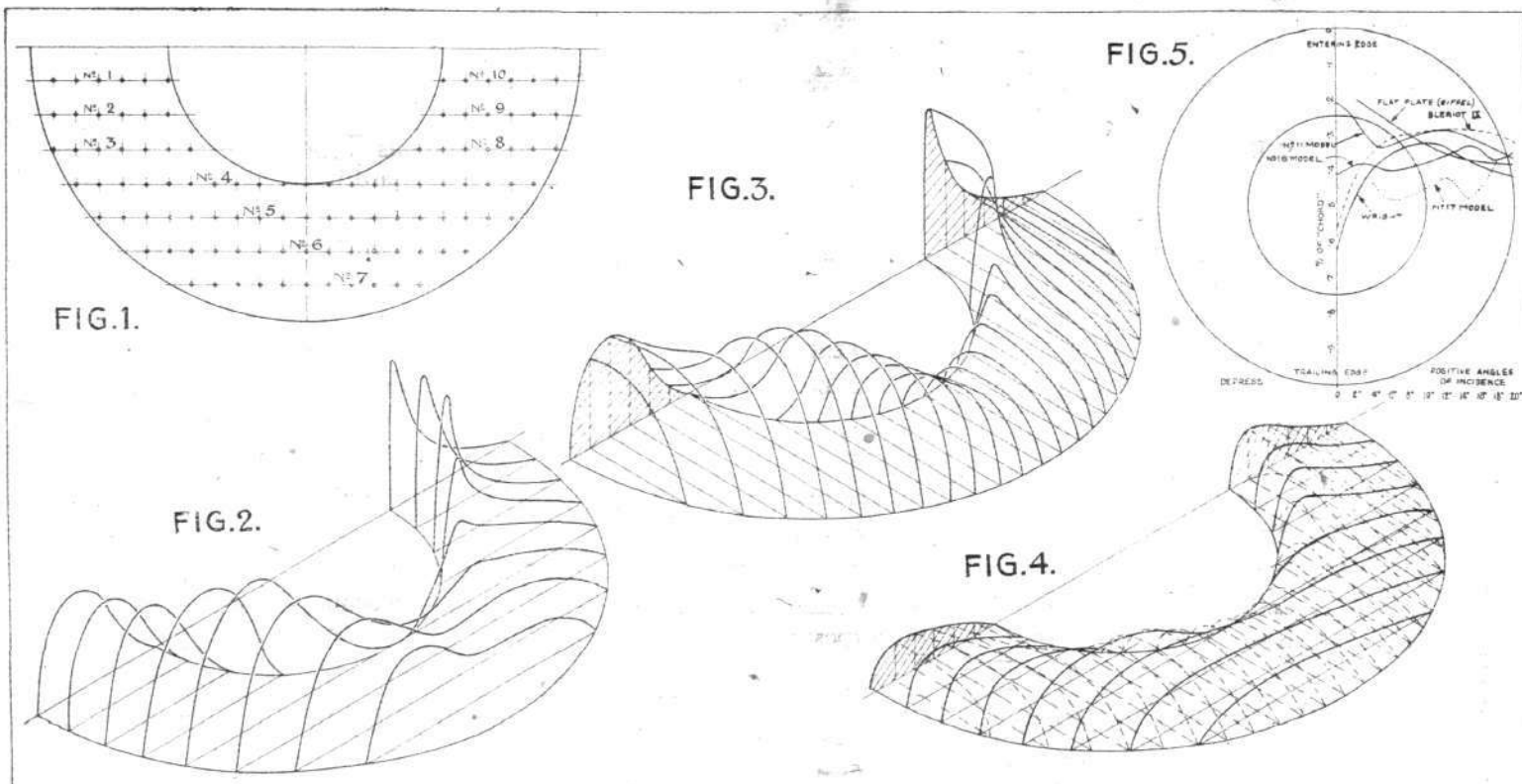
**THE ANNULAR AEROPLANE:** The curves on the left give the results obtained with model No. 11. The N.P.L. lift curve is higher than the E.L.C. curve on account of the fact that the former used an arbitrary base line for setting angles, while the latter used the angle of the fourth camber. If, however, the N.P.L. curve is moved to the right  $4.4^\circ$  the two curves coincide very fairly. The ringed spots show the N.P.L. points thus shifted. On the right are the characteristic curves for model No. 16, as obtained at the E.L.C. The full lines show wing only, while the dotted lines show wings No. 17 with fuselage No. 18. It is a remarkable feature of the annular wing that there is no sudden drop in the lift curve, while the L/D curve is without the usual "peak." The maximum L/D for model No. 17 is about 9.

dual rôle of elevators and ailerons. The high degree of natural lateral stability of the machines, however, gave rise to little trouble on this score. We understand that if Mr. Tilghman Richards were to design one of his annular 'planes nowadays he would so design the wings that the sides, or apteroid section, could be warped for lateral control.

The Shoreham machines were of very difficult and expensive construction, as the plan view of No. 1 will show, and Mr. Richards has evolved a much simpler form of construction, in which all ribs lie in the direction of flight, while the spars form a polygon, as seen in plan. This form of construction should not be very much more difficult than that of the ordinary type of wing.

With regard to the model tests to which we have already briefly referred, these were mainly carried out at the East

London College in the wind tunnel built by Mr. Tilghman Richards. A certain model, No. 11 to be exact, which was the first constructed and tested at the E.L.C., was submitted to tests at the N.P.L. as a check on the accuracy obtained at the former laboratory. With the exception that the N.P.L. chose the chord line of the leading section, whereas at the East London College rib No. 4 (the tangential rib) was used for the base line, and that there was thus an angular difference in setting of something like  $4\frac{1}{2}^\circ$ , the two sets of results agree very well, as shown in one of the accompanying curves, where the N.P.L. lift curve has been shifted to the right  $4.4^\circ$ . Thus the accuracy obtained at the E.L.C. may be regarded as being very good. This is interesting on account of the fact that the method adopted was rather different from usual practice in that, instead of taking readings of lift and drag



**THE ANNULAR TYPE OF PLANE:** Results of pressure plottings carried out at the East London College. Fig. 1 is a semi-plan of the model, showing positions of holes. Fig. 2 shows negative pressure plottings of upper surface in isometric projection, the readings being taken longitudinally. The leading edge faces left. Fig. 3 shows negative pressure plottings of upper surface in isometric projection, the readings being taken laterally. In Fig. 4 are shown the positive pressure plottings of the under surface, longitudinal readings being drawn in solid and lateral readings in broken lines. In Fig. 5 are plotted, on a plan view of the model, the travels of the centre of pressure for a number of wings. It will be noted that the c.p. travel of model No. 11 is stable, while for the other models it is approximately neutral. For wings of orthodox shape the c.p. is, of course, unstable.



against angle at constant wind speed, the readings were taken of lift at varying wind speeds at selected angles. This method gave straight-line curves passing not through the origin but a known distance to one side. Thus two safeguards were introduced. If the first curves did not pass the origin at the known distance the wind-speed measurements alone must be at fault, provided the points formed a straight line. Any irregularity in the second curves could only be caused by faulty setting of model for angle, and this could easily be traced back and re-tested.

A large number of models were tested, the first of which was No. 11, which did not, it will be seen, give very good results as regards efficiency. Other models, using different wing sections, gave better results. For instance, model No. 17, whose characteristic curves are published herewith, have a maximum L/D ratio of about 8.7 *with fuselage*. Considering that the tests were made with old-fashioned sections, this result is very good, and must have been considerably better than the average maximum L/D obtained with contemporaneous machines. As far as tested the lift went up to a maximum lift coefficient of 0.5 absolute, but as the tests did not go above 20° there is no means of telling what was really the maximum lift coefficient. A biplane model was tested, whose curves space does not permit of publishing. This model was tested up to 30°, and it was found that the lift reached a maximum value of 0.42 and then remained sensibly constant up to 30°, the lift curve over the last section being for all practical purposes a straight horizontal line. In other words, the circular biplane did not show any burble point. There is no reason to believe, and the flying experiments seemed to confirm the opinion, that the monoplane type would behave differently as regards stalling angle, and this appears to be one of the most interesting features of the annular 'plane. It has no stalling angle, or if it does have one the sudden drop found with ordinary wings is turned into a very gradual drop in the annular wing. In view of the fact that it is generally admitted that the majority of flying accidents are due to stalling, this feature of the annular 'plane alone seems to entitle it to attention for further development.

The pressure plotting curves are of interest in showing the distribution of lift over the annular surface. Mr. Tilghman Richards is of the opinion that over the leading and trailing portions of the annular wing the lift reaction is of normal type, as found on the high aspect ratio "pterygoid" 'plane, while over the side portions, or "apteroid" sections, there is a vortex motion which gives rise to lift, a sort of "false lift," which contributes towards the lift of the entire surface.

The centre of pressure can be kept stationary with the annular type of wing, or it can be made to move in a stable direction. On model No. 11 it was a stable movement, as will be seen from the curves of c.p. movement. In other models it was quite neutral, and on one power-driven machine built the c.p. was neutral. This, however, had the effect of rather frightening the pilot, as he could not "feel" the machine.

From an aerodynamic point of view the annular plane may be summed up as follows: It gives a high lift, without violent stalling point; it develops the high lift at large angles; its L/D curve is very rounded, with a not very high maximum value; and it can be made stable to any desired degree.

As regards efficiency it should be remembered that these model tests were carried out at a time when the best, or one of the best, wing sections known was the R.A.F.6. It seems reasonable to suppose that by employing modern sections, perhaps some of the good modern high-lift sections and others similar to R.A.F.15, considerably higher values of L/D may be obtained. Even granting, however, that on the score of efficiency the annular plane is somewhat inferior, does it not possess certain advantages which will largely offset any such inferiority?

Take, for example, the question of structure weight. The circular type of wing, with a fuselage resting on it at both its ends, should work out very light per unit of area, more especially so in the case of large machines. Then there is the question of overall size. A machine of the annular wing type, having a wing area of close on 1,500 sq. ft., would only have an overall span of 50 ft. This in monoplane form. If in biplane form the span would be reduced, for 1,500 sq. ft. of area, to about 35 ft. An ordinary monoplane of this area, if of normal proportions, would have to have a span of approximately 100 ft., and a biplane about 70 ft.

If one imagines a commercial passenger 'plane of the annular type, the cabin would occupy the central part of the fuselage, and the view would be practically unrestricted in all directions. The circular wing entirely surrounding the cabin should make for safety in a crash, as a great deal of structure would break before the cabin touched, and would thus considerably lessen the shock.

Taking it all round, it would appear that there is quite good reason to give these early experiments of Mr. Tilghman Richards a close scrutiny with a view to seeing how far past experience justifies taking them up again where they were left off in 1914. Here, we think, is a case where the light 'plane would come in very usefully in allowing full-scale flying experiments to be carried out at relatively low cost.

## PILOT'S LICENCE REGULATIONS

### Air Navigation Directions, 3 C

1. THE Air Navigation Directions, 1922 (A.N.D. 3), as amended by the Air Navigation Directions, 1923 (A.N.D. 3A), and by the Air Navigation Directions, 1924 (A.N.D. 3B), are hereby further amended as follows:—

(1) After paragraph 53, the following new paragraph is inserted:—

"53A. A person applying for the grant or renewal of a pilot's licence to fly flying machines other than flying machines carrying passengers or goods for hire or reward (*i.e.*, a 'Private Pilot's Licence' as referred to in paragraph 55 hereof) will be required to undergo a medical examination by a duly qualified medical practitioner, who may be the applicant's usual medical attendant. Such examination shall be conducted in accordance with C.A. Form 61, and a copy of that form, completed as required, shall be forwarded by the medical examiner to the Secretary (D.C.A.), Air Ministry, London, W.C. 2 (by whom copies will be supplied on application)."

(2) For paragraphs 60 and 61 (including the heading "Flying Experience") the following provisions are substituted:—

"Flying Experience, etc.

"60. As regards Private Pilots' Licences for flying machines:—

"(a) A candidate for the issue of a licence will be required to produce satisfactory evidence that he has carried out not less than three hours solo flying during the twelve months preceding the date of the application. The evidence normally required for this purpose will consist of the production of a Pilot's Log Book recording such flying, or of a certificate issued by a responsible authority or person approved for the purpose by the Secretary of State.

"(b) A candidate for the renewal of a licence will be required to produce in respect of the preceding twelve months the same evidence as is mentioned in sub-paragraph (a), or in default thereof to carry out satisfactorily the following

practical flying tests under the observation of an official observer appointed by the Royal Aero Club, or of some person approved for the purpose by the Secretary of State.

"(i) To execute three figure-of-eight turns, and  
 "(ii) To carry out three landings, finally stopping the aircraft on each occasion within a distance of 50 yards from a point fixed by the candidate before starting.

"61. As regards pilots' licences for passenger or goods flying machines:—

"(a) The maximum period for which a candidate for the issue of a licence may not have flown but yet may be considered to have recent reasonable flying experience is six months.

"(b) A licence will be granted only for such types of flying machines as the applicant can produce evidence of his ability to fly. A licence may, however, be extended to cover further types on production of evidence of the holder's ability to fly those types.

"61A. With reference to proviso (b) to Art. 3 (1) of the Order and proviso (c) to Art. 4 (1) thereof, a flying machine may be flown by a person not holding a Private Pilot's Licence for flying machines for the purpose of becoming eligible for the issue of such a licence, provided that the following conditions are complied with:—

"(i) The flight must start from, take place within three miles of, and finish at, a licensed aerodrome, a Royal Air Force aerodrome, or an aerodrome under the control of the Secretary of State.

"(ii) Before the flight is commenced, notice that it is being undertaken for the purpose stated above must be given to the person in charge of the aerodrome from which the flight starts.

"(iii) No passengers may be carried."

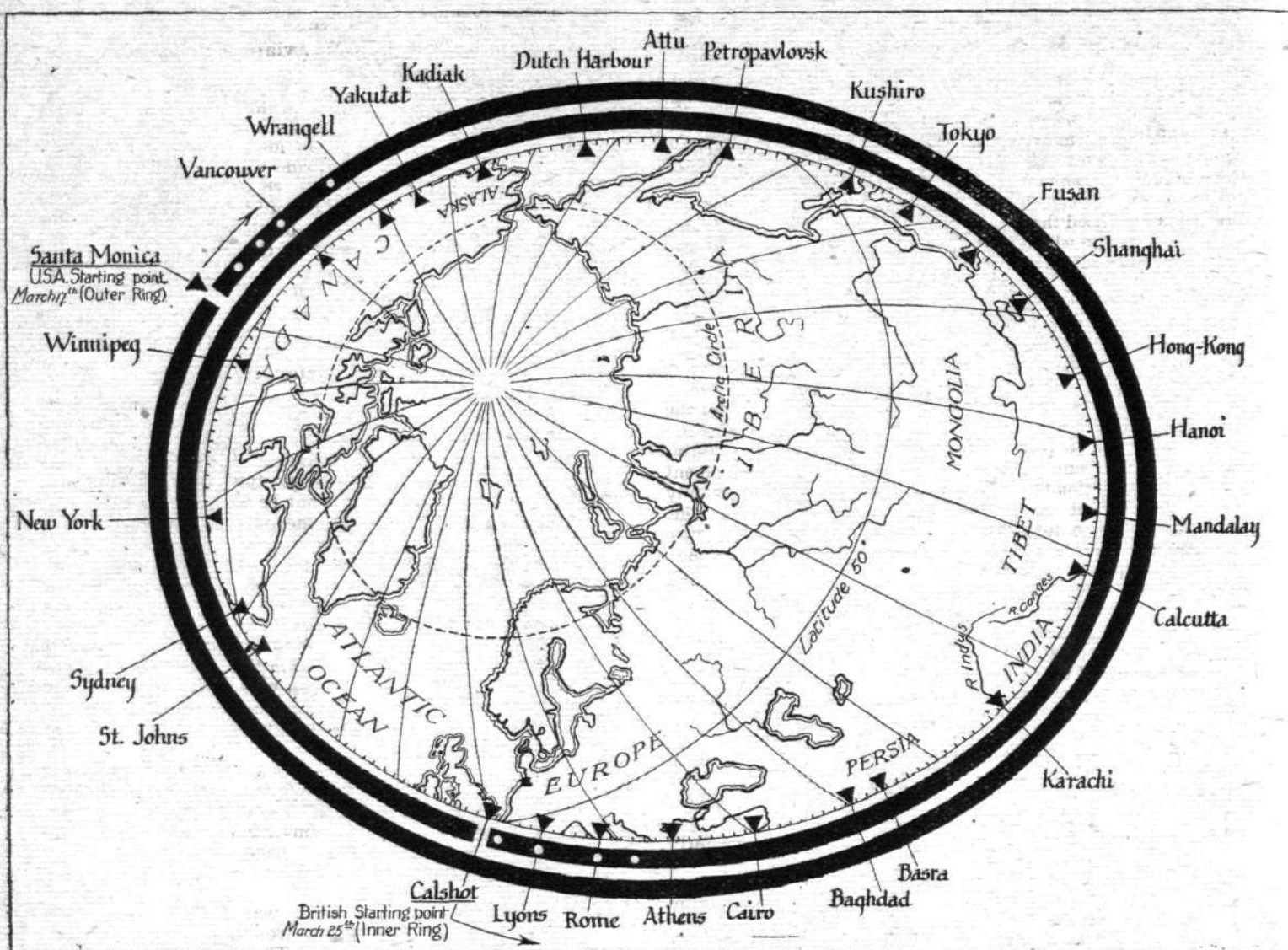
2. These Directions may be cited as the Air Navigation Directions, 1924 (A.N.D. 3c).

3. These Directions shall come into operation forthwith.

THOMSON, Secretary of State for Air



# ROUND-THE-WORLD FLIGHTS



**ROUND-THE-WORLD FLIGHTS:** This sketch map has been prepared to show at a glance the position every week of the British and American crews as known up to Tuesday evening. It is proposed to publish this map week by week, and to mark on the two dark rings by white spots the approximate position reached by American and British aviators. The direction followed by the Americans is clockwise (i.e., east to west), and that of the Vickers "Vulture" anti-clockwise (west to east). The Americans left Santa Monica, California, on March 17; the British crew left Calshot (Southampton Water) on March 25. On Tuesday evening the Americans had all reached Prince Rupert, B.C., while the British were still at Corfu awaiting a new engine.

THE second week of the air "race" round the world has seen the American team resuming their journey after their few days' stay at Seattle, while the crew of the single British machine are still held up at Corfu. The trouble which caused the descent at Corfu is stated to be the stripping of the airscrew reduction gear wheel. At first it was thought that only a new gear wheel would be necessary, but further examination brought to light certain damage to the engine crankcase. Rather than attempt a repair out there or in Italy, it was decided to have a new engine sent out, and D. Napier and Son immediately took the necessary steps to achieve this end. Thus, it is unlikely that Squadron-Leader MacLaren will be able to resume his flight before the end of next week. Having been delayed at Seattle by bad weather, the American team, when conditions did improve, had trouble with their machines, and could not at first get them off the water. However, they eventually got away on April 6, and arrived during a snow-storm at Prince Rupert Harbour, B.C., the same evening.

We give below a brief log showing the progress of the "race" up to Tuesday, April 8.

March 17.—American team left Santa Monica and arrived Sacramento.

March 18.—Sacramento—Eugene, Oregon.

March 19.—Eugene—Vancouver, Wash.

March 20.—Vancouver, Wash.—Seattle.

March 25.—British start from Calshot and land near Havre, owing to bad weather.

March 26.—Havre—Lyons.

March 27.—Lyons—Civita Vecchia (descent owing to darkness).

March 28.—Civita Vecchia—Rome (damaged float).

March 29.—Repairs and overhaul at Rome.

March 30.—Rome—Corfu, engine trouble. Present position.

April 6.—American team leave Seattle 9.20 a.m. and arrive at Prince Rupert Harbour, B.C., after 8 hours' flying through bad weather. Major Martin damaged his machine on landing, and it was decided to remain at Prince Rupert a few days until repairs had been completed. Present position of all four machines

The American team, of four Douglas biplanes (400 h.p. Liberty), consists of Major F. L. Martin, Lieuts. L. H. Smith, L. Wade and E. H. Nelson, and mechanics.

The British flight is made up of Squadron-Leader A. S. C. MacLaren, Flying-Officer J. Plenderleith and Sergeant Andrews, on a Vickers (Napier "Lion") amphibian flying boat.

Respective mileage (approximate) completed to date.—American, 1,300 miles. British, 1,500 miles.



# THE BRITISH AVIATION MISSION TO THE IMPERIAL JAPANESE NAVY\*

By COLONEL THE MASTER OF SEMPILL, A.F.C., A.F.R.A.E.S.

(Lately, Acting Captain, Imperial Japanese Navy, and Commanding British Aviation Mission)

DURING the late War, it is no idle boast to say that the Japanese Navy became impressed with the work of our own Naval Air Service and convinced of the necessity of having a similar organisation. Admiral Baron Kato, I.J.N., then Minister of the Navy, known to all as the Chief Japanese Delegate at the Washington Conference, decided to approach the British Government through the usual channels for assistance. It can well be realised that, in view of the very close relationship on naval matters which had always existed between the two countries, with admirable results, such a decision was a most natural one. In 1920 official application was made for the loan of the services of an Aviation Mission composed of personnel seconded from the Royal Air Force. The request no doubt came at an awkward time, as the endeavour then was to clear up after the War and reorganise the fighting services on a peace basis. Several departments of State had a voice in such a matter and a decision was long delayed. From the Japanese aspect this was serious, particularly as no indication was given that the request would be acceded to at all. Eventually a reply was sent regretting that the British Government was not in a position to render the assistance required, mainly on the grounds of extreme shortage of personnel. At this time the Japanese authorities, perturbed at the delay, were seriously considering the advisability of applying elsewhere, and we must bear in mind that a French Aviation Mission had already been despatched to Japan for the purpose of reorganising the Military Air Service. So impressed, however, were they with the undoubted pre-eminence of Great Britain in matters pertaining to the naval side of aviation that they decided to request that the name of a suitable officer who had served in the Air Forces might be suggested, and I must consider myself singularly fortunate in being given the first offer of undertaking this work.

In January, 1921, I came to an agreement with Rear-Admiral Kobayashi, then the Naval Attaché, and actually commenced the organisation of the British Aviation Mission on the first of the following month. The Japanese authorities, very wisely realising that we had experience that would be peculiarly valuable to them, placed no major restrictions whatever in regard to the organisation of the Mission, which was charged with the reorganisation, equipment and training of the Imperial Japanese Naval Air Service.

The Mission was composed almost without exception of personnel who had been in the Royal Naval Air Service, as they naturally possessed the particular experience which was desired. The staff numbered thirty, there being eighteen officers and twelve warrant officers (second class). The organisation was similar to that in the Royal Naval Air Service, and in consequence conformed very closely indeed to that of the Japanese Navy. The Japanese Admiralty granted acting commissions to all members with ranks equivalent to those they had already held previously in the British Air Service.

The original agreement was for one year, but it was clearly realised on both sides that such a period would have to be considerably extended. As it transpires, over three years have been spent, approximately 70 per cent. of which time in an executive capacity and 30 per cent. in an advisory.

## Air Organisation in the Japanese Admiralty

In the Japanese Admiralty there is at the moment no separate Air Department, but there are sections in the principal departments appointed to deal with aircraft matters. The work of these various sections is co-ordinated by the Minister of the Navy.

Air stations generally are administered under a Commander-in-Chief, as is the case with ordinary Admiralty establishments. In special cases, such as for air training stations, an officer may be appointed in command being directly responsible to the Minister of the Navy.

Plans have been put forward for the creating of a Naval Air Service, manned by personnel seconded from the Navy, or in certain instances obtained by direct entry. This would necessitate the creation of a Naval Air Department, the head of that department being directly responsible to the Minister for all air matters, the closest liaison being kept with the N.G. Staff and other departments as circumstances dictated.

The well-known controversies that have raged round Air

Service organisation have occurred in Japan, and there was at one time a serious move towards a unified and separate Air Service. This emanated from the Military Air Service, but it may be remarked that such an idea was at no time very popular with those on the naval side.

The late Admiral Baron Kato, the Prime Minister and Minister of the Navy, who was Chief of Staff to Admiral-of-the-Fleet Count Togo at the famous battle of Tsushima, and Admiral Yamashita, the Director of Operations at that time and now Chief of the Naval General Staff, were very wisely strongly opposed to such a suggestion, in view of the divergent policies and different system of the Military Air Service and for other important reasons.

## Organisation of the Mission

The Mission was divided into four principal sections: Flying, Technical, Armament and Photography. In addition to the staff under the above heads there was a medical officer and first lieutenant and a W.O. writer.

It naturally took some time to get together the necessary personnel, many of whom could not be secured at once. By the middle of March, however, the bulk of them had been obtained.

Whilst it was necessary to keep back a number of officers to assist in obtaining the material required, it was possible to despatch an advance party under the Second in Command, including three flying officers and two engineer warrant officers, on March 12 by quickest route via America. The rest of the personnel sailed in batches, via the Ports, as preparations on this side advanced. It can well be realised that the vast quantity of material of every description that was required took a considerable amount of time to purchase, inspect and ship.

The advance party arrived in Japan in the middle of April, and proceeded at once to inspect the site proposed for the new Central Training Station of the Naval Air Service. The activities of the Mission were concentrated chiefly at this station—Kasumigaura, meaning "Lagoon in the mist"—which lies on the shores of a lagoon of the same name about 40 miles north-east of Tokyo.

The site had been well chosen, as was quite evident from the preliminary inspection of the ground marked out, and whole-hearted approval was given. The aerodrome lies about one mile from the shores of the lagoon on a raised plateau, and is of very generous dimensions. The area at the present moment available for landing on is about 700 acres, and there are excellent facilities for expansion to over double that area when such is found necessary. I do not propose to go into further details of the lay-out of the aerodrome, as these can be so much more readily appreciated from a few slides I have to show.

Arrangements were made on the shores of the lagoon for the building up of a seaplane station suitable for preliminary training. The lagoon is not tidal and is of vast area, covering over 60 square miles, being some 25 to 30 miles in length, with an average width of 3 to 4 miles, and offering unique facilities for training purposes with seaplanes and flying boats.

A light railway was constructed for bringing in stores from the nearest railway station. Communication for personnel between the railway and air station was by road or water.

Very excellent quarters were specially constructed for the Mission with every possible facility, including a billiard-room with two full-size tables and tennis courts adjoining.

As has already been mentioned, certain Avro machines and "F.5" flying boats had been ordered. This was unfortunate in some respects, as it committed us to using the "F.5" type of flying boat, which, although undoubtedly an excellent machine in its day, had been superseded by a more modern type in the "P.5." The Avros were naturally useful as this machine had been selected for preliminary training.

It was most important to select types of machines which could be easily obtained, as it was necessary to have them shipped to Japan at the earliest moment. Equipment was obtained from many firms such as Messrs. Armstrong-Whitworth Aircraft Company, Blackburn Aeroplane Company, Gloucestershire Aircraft Company, Supermarine Aviation Company, Vickers, Ltd., Rolls-Royce, Ltd., Napier and Son, Ltd., Geo. Parnall and Co., Short Bros., A. V. Roe, Ltd., Disposals Company, Nobel Industries, Ltd., Monarch

\* Extracts from paper read before the Royal Aeronautical Society on April 3, 1924.



Engineering Company, Butchers, Yorkshire Steel Company, Metal Air Screws, Ltd., etc., etc.

The types of machines selected were as follows:—

#### Preliminary Training.

Preliminary training for all pilots, Avro "504K" with 110 "Le Rhone."

Preliminary seaplane training, Avro "504L" with "B.R.1."

(Chosen so as to avoid multiplication of different types).

#### Scout Training.

"Sparrowhawk" with "B.R.2." (These machines were "Nighthawks" originally destined for the unsuccessful "Dragonfly" radial engine, but were modified so as to take the "B.R.2," a type of engine immediately available.)

#### Flying Boat Training.

Preliminary flying boat training, Supermarine "Channel" type with Siddeley "Puma."

Flying boat training, "F.5" fitted with two "Eagle VIII."

#### Fleet Co-operation.

Fleet spotting and deck landing, "Panther" with "B.R.2," also fleet type "Sparrowhawk."

Torpedo dropping, "Cuckoo" with "Viper" engine.

In addition to the above machines several of the latest types were taken out with a view to experimenting with them under actual service conditions in Japan. These were Blackburn "Swift" torpedo carrier, Supermarine "Seal" amphibian fleet spotter, and Vickers "Viking" amphibian fleet spotter.

In all approximately 200 machines were ordered in the first instance. These orders were supplemented at a later date from Japanese as well as British sources. In addition to engines fitted into machines, some "Lynx" engines were ordered for fitting into Avros with a view to utilising this engine for training purposes. It was also proposed to utilise the "Jaguar" in the Scout machine, the "Sparrowhawk," provision being made for it, thereby entailing the minimum of alteration. The advantage of having two engines of similar type wherein certain parts are common may be well appreciated.

A few types of machines in common use during the War were also taken out as samples of prominent Service types, such as "S.E.5A," "D.H.9," Martinsyde "F.4," etc., also various types of engines for instructional purposes.

In addition to the actual machines and engines required, a vast amount of material had to be arranged for, such as spare engines, aircraft and engine spares, spare floats for seaplanes, propellers (wood and metal), Hucks' Ford starters, electrical equipment, instruments, dopes and fabrics, A.G.S. parts, tools, bolts and nuts, oil, P.R. tubing, sparking plugs, armament and photographic supplies, medical equipment, and the hundred and one things which go to the making of a fully equipped Air Service.

The official opening of the aerodrome at the end of July was preceded by a Shinto ceremony consecrating the ground to the use of the Imperial Forces. It is interesting to remark that a propeller was placed on the altar as an emblem suitable to the occasion. As an indication of the interest taken in flying it may be mentioned that there were present on this occasion upwards of 30,000 spectators, many of whom had walked great distances.

The first course of instruction commenced on September 1 with twelve probationary flying officers, one of whom was a military officer being specially trained at the request of the War Office. Since that date training has progressed without intermission, and, of course, the number of officers under instruction has gradually increased as additional facilities became available. Courses of instruction were carried on concurrently for engineer officers, armament and photographic and various other specialist officers, as also for warrant officers petty officers and ratings.

As already mentioned, the organisation of the Mission was split up into four principal sections, and I will endeavour to outline generally their scope.

#### Flying

The Flying Section of the Mission was composed of six officers: one in charge, one for preliminary training, one for flying boats, one for seaplanes and preliminary flying boat training, one for scouts and one for deck-landing and fleet co-operation. With each of these officers were a number of Japanese officers acting as assistant instructors, together with pupils and the necessary personnel. All pilots who were accepted, i.e., those who had passed the special medical examination, were posted to the Avro Flight, where they had

to graduate in the Gosport system. After successfully passing their preliminary course they would follow either of the under-mentioned routines, depending on the suitability of the individual pupil, the exigence of the Service and his desires, as far as possible:—

Scouts.

"Panther" ship aeroplane.

Fleet training course.

Turret flying and deck-landing.

Torpedo dropping, etc., from "Cuckoo" and "Swift" torpedo planes.

Seaplanes and/or preliminary training flying boats.

"F.5" flying boats. Long cruise round a portion of Japanese Islands (1,500 to 2,000 miles).

Fleet training course.

Special flying courses for observer, gunnery, photographic and W.T. officers were organised in the flights concerned.

All pilots had to undergo concurrently with the above suitable courses of technical instruction in aircraft, engines, armament, photography, navigation and wireless telegraphy. Night flying using Holt flares or the Lucas-Cranwell electrical sets was practised. The Fleet courses were very comprehensive, being carried out at Yokosuka, the nearest naval base.

An experimental flight, for dealing with new types, did in a small way such work as would be done at Martlesham Heath. There is a speed course, electrically timed and with camera obscura.

The general conclusion reached as to the ability of the Japanese as pilots is that there is little difference in the time taken to pass successfully through the Gosport course of preliminary flying training, particularly when allowance is made for the fact that most of the pilots under instruction had at the commencement an imperfect knowledge of English, thus making the important conversations on the ground with their instructors and lectures not so readily understood as one would wish. They show little, if any, signs of nerves, and are always ready to attempt the most difficult manoeuvres.

Mechanical contrivances in general have, of course, only been known in Japan in recent years, and this fact may no doubt account for the little interest shown by the average pilot in such devices being kept at the highest pitch. There is not, for example, the same keenness as exhibited by the youth of this country to possess a motor-bicycle and keep it in the highest possible state of perfection. Such mechanical sense will undoubtedly develop, and in fact during the years we have worked with the Japanese and insisted on this point a noticeable improvement has been made. The general average of ability in pilots is distinctly high, possibly higher than we are accustomed to find in this country, but it would seem likely that there is a smaller percentage of abnormally good pilots. Due no doubt to the fact that the ancient cult of Bushida, education and tradition have tended to produce a racial and not an individual type, we may expect to find, and in fact do find, a certain indecisiveness when they are thrown into a situation entirely unexpected, not to say dangerous. They do not seem to possess to the most desirable extent that instinctive sense of prompt action so essential under such circumstances, although if given time they would no doubt extricate themselves successfully.

They have the virtue of courage developed to the fullest extent, and would go to any length to carry out orders, no matter what the odds were. They also have great powers of endurance.

Technical training has done much to encourage pilots to take a real interest in their machines and engines, and every endeavour is made to foster healthy competition between respective units. The Japanese are often oblivious to disquieting noises in an engine, but training and practical experience have already tended to develop a keener mechanical sense of hearing.

The smaller stature of the Japanese is an advantage in many ways, but a disadvantage to them when suddenly called upon to fly a British machine; a number of minor alterations to controls, seats, etc., were required.

The mechanics are deserving of the highest praise, being extremely keen to learn and very hard working, and have great *esprit de corps*.

Practically all casualties were due to error of judgment of a common nature. No fires in the air or after crashing occurred. No machine failed in the air from defective structure.

#### Technical Section

The Technical Section was composed of five officers, one in charge of section, one for aircraft, one for engines, one designer and lecturer on aeronautical engineering, and one for technical training and also parachute training. As indicated previously, there were also five warrant officer engineers, four riggers and



one draughtsman attached to this section. A warrant officer would be attached to one or more flights, workshops, etc., to instruct and generally supervise the work. Engineer officers and ratings were continuously under instruction in the flights and workshops, but this procedure was a temporary measure pending the formation of the School of Technical Training, which includes fully-equipped shops for the purpose of giving instruction in every branch. At the commencement, of course, there were no facilities at all for the overhauling and repair of engines and aircraft, but such were gradually built up so that within a period of less than two years the repair shops, which were absolutely self-contained, had a capacity of completely overhauling sixteen rotary and eight stationary engines of the "Viper" type, or alternatively to this latter two "Eagle VIII's" and one "Lion" per week.

The capacity of the aeroplane repair shop would be about six completely-rebuilt machines a week. These facilities are to be considerably extended.

The engine repair shop and machine shop are situated in the centre of the flight hangars, which are in the middle of the aerodrome. The machine shop has the most complete equipment of lathes, milling, shaping, gear-cutting and grinding machines, etc. Adjoining this is the engine repair shop, with two small completely equipped shops for the repair of magnetos and carburettors. There is a foundry capable of handling castings up to 5 cwts., and blacksmiths, copper-smiths, tinsmiths and sheet metal workers' shops, fully equipped with welding, case-hardening and other essential equipment. Stores for raw material, complete engines, engine spares and tools were conveniently situated. Test benches for handling engines of any type up to 1,000 h.p. and fully equipped are close to hand.

Many of the machine tools are of Japanese manufacture, and in most cases very well made, although in some instance material of an unsuitable specification has been used. A well-equipped laboratory for the testing of all materials was organised.

The aircraft repair shop was equally complete with wood store, wood-working, propeller building and repair, dope and fabric shops and all the necessary stores.

The engineer officers are all extremely keen, but were almost without exception far too immersed in theory, being content to leave all practical matters involved in the running of an air station to their petty officers and men. To change this took time, but practical example had its effect, and from top to bottom the fundamental necessity of a very thorough practical training is now recognised.

The men are splendid, keen and hard working, and the doctrine of "a limitation of output" does not exist. They will often forego leave without being asked in order to finish some work on hand.

### Aircraft

The machines used are in most cases so well known here that detailed comments are unnecessary. Troubles were experienced with the damp, but were not serious. Every variety of climate is to be met with, and all-metal aircraft will possess very definite advantages. The various systems of this form of construction are now receiving close attention.

All machines gave results quite up to if not above the average. The "Sparrowhawk" fulfilled all expectations, and proved the most successful scout training machine so far met with, and if fitted, as planned, with a radial engine ("Lynx" or "Jaguar") would be even better.

"F.5's" were kept moored out, only being brought ashore periodically. The policy of man-handling such machines should, it is thought, be reduced to a minimum, and the old-time method of putting machines in sheds each night rendered needless by the improvement of weathering qualities.

No structural failures occurred in the air nor fires as the result of a crash.

Interesting tests under service conditions, and in some cases from the aircraft carrier "Hosho," were carried out with the Blackburn "Swift" torpedo carrier, which is similar to the "Dart," the standard Air Force type; the Supermarine "Seal" amphibian flying boat, similar to the "Seagull" (which is an improved "Seal"), the standard type used in the Royal Air Force aircraft carriers, and the Vickers' "Viking" amphibian flying boat, the forerunner of the "Vulture" now attempting the world-flight.

### Engines

All types are so well known here as to need no comment. Failures were very few, and mostly confined to the "Le Rhone," an engine very sensitive on the fine adjustment and with single ignition. Running times before complete or partial overhaul were well up to the average standard. It was found desirable to lower the compression ratio of the "Lion" from

8 to 1 to 5 to 1, as the machines into which this type are fitted operate in general at a low altitude.

During the winter months it is sometimes necessary to attach special spinners to the propellers of the rotary engines to prevent over-cooling. Before taking this precaution engines had failed, due to the complete blocking of the crankshaft with ice.

### Aircraft Carriers

The Japanese Navy have the distinction of being the first navy in the world to lay down an aircraft carrier.

In December, 1920, the "Hosho" was laid down at the Asano shipyard, near Tokyo. She is a vessel of 9,500 tons, with a speed of 25 knots. Her length is 510 ft., beam 62 ft. Her first sea trials took place in March, 1923.

Prior to the earthquake two battle-cruisers, which had been scrapped by the Washington Conference, were to be converted to aircraft carriers of something like 25,000 tons each. One, the "Amagi," was, however, so damaged at the Yokosuka Dockyard by the effects of the earthquake as to necessitate scrapping. The "Akagi" is being proceeded with. The battleship "Kaga," also due for scrapping under the Washington Treaty, is probably to be modified and converted into a carrier. The accompanying slides show the flying deck of the "Hosho." As yet deck-landing is in its infancy, having been practised so far by a selected number of skilled pilots.

There is also a small seaplane carrier, the "Wakamiya," which was put into commission some years ago.

### Propellers

Wooden propellers, as might be expected, give a good deal of trouble in Japan, particularly in the summer. All the wooden propellers we had in use were manufactured in this country. There is good reason to believe that those manufactured in Japan, particularly from suitable indigenous timbers, would be superior.

A number of steel propellers of the Leitner-Watts variety were tried on each type of engine. Some of these were two and others three bladers. Many have been running for a considerable time, and no failures have occurred. There can be no doubt that the metal propeller will come more and more into general use, as its advantages, particularly in the tropics and for seaplanes, transport as spares, etc., are very large. On our principal aerodrome, which is of large area, the grass and vegetation generally grow with such remarkable rapidity in the spring and early summer that it is almost impossible to cut the whole area rapidly enough. Under these conditions the anxious pupil embarking on his first solo and being told to keep his tail well up, does so with such effect that the grass gets cut by the propeller, with results which are disastrous after an average morning's flying. The wastage of wooden propellers was under these circumstances extraordinarily high. Steel propellers, of course, never suffered and could cut grass with impunity. At the time these propellers were ordered, in the commencement of 1921, they were the only type of metal propeller being manufactured in the world. Since that day minor improvements in design and methods of manufacture have led to the production of a superior product, particularly as far as interchangeability of blades and weight-saving are concerned. It is, I think, well known that propellers for horse-powers of under 500 are heavier if made of steel, but above this the reverse applies.

### Dope

It was realised from the commencement that the Japanese climatic conditions would be peculiarly trying to doped surfaces on account of the great dampness in the summer months and also on account of the strong sunlight. For these reasons it was decided to use a pigmented nitro-cellulose dope which had been developed by the Royal Aircraft Establishment, known as P.D.N.12. Aluminium nitro covering V84 was used in addition. This doping scheme was largely employed, and three coats of dope, plus two coats of the nitro covering, proved entirely effective, and when comparing with machines doped with other preparations of a cellulose acetate basis it never failed to show to extreme advantage. The well-known defect of the slackening off of fabric doped with a cellulose acetate preparation was most marked under the humid conditions prevailing, particularly in the early mornings in the summer months, although under such conditions no change occurred when nitro dopes were used.

### Parachutes

Two types are used as standard—the Guardian Angel D.4 and the Mears.

The Mears is particularly useful for fitting on machines where it is difficult to stow the D.4. It does not, however, function satisfactorily in still air and is not consequently suitable for dropping from kite balloons. All these parachutes were made of cotton, but in future orders will be made of silk



on account of the smaller bulk and superior glissading qualities of this material.

A series of fifty drops with 150-lb. dummy weights were carried out with the Mears parachute from between 400 and 500 ft., and in some cases as low as 200 ft. The average time taken for the parachute to open was  $1\frac{1}{2}$  seconds. In one instance the unrolling strip was purposely not attached to the aeroplane, and the parachute was allowed to fall without unrolling from a height of 600 ft. After falling some 400 to 450 ft. it emerged from its case and functioned quite normally. The reliability of the Mears which had been in dispute was amply proved.

#### Armament Section

The Armament Section consisted of one officer in charge and one assistant, together with a number of Japanese officers and men, none of whom had previously had much, if any, up-to-date experience in this particular branch.

The material in use was thoroughly up to date, and, generally speaking, in line with that used in this country. Vickers and Lewis guns are, at the moment, used as standard. There are bombs up to 500 lbs., and, of course, others in contemplation. Torpedoes are very similar to our own, and are manufactured in Japan.

The most complete facilities were available for instruction. On the range, instruction (Vickers and Lewis) could be given on the ground or in the rocking fuselage, or in fuselages with engines, as, for instance, in the case of observers.

Bomb-dropping at the Central Training Station has been mainly confined to the dropping of practice bombs filled with stannic chloride at targets moored on the lagoon. This, of course, is in addition to practice with the Batchelor Mirror, which was sometimes placed in a seaplane tender. Practices with camera guns followed by Lewis and Vickers for both pilots and observers are carried out over the lagoon at suitable targets.

Preliminary practice in torpedo-dropping with dummy torpedoes is carried out over the lagoon. For live bomb-dropping and advanced torpedo work a special station is in course of equipment in the South of Japan, where conditions are particularly suitable for carrying out such exercises.

#### Photography

The Photographic Staff consisted of an officer and a warrant officer, both of whom had been photographers by profession before joining our own Air Service at the commencement of hostilities, where they gained a vast amount of air experience.

Japanese as a whole are inordinately good on photography, so this at least was a good atmosphere to start with.

From the commencement, photographic records were kept of the progress of work, and considerable benefit was derived from mosaics in considering the lay-out of the whole station.

The training of specialised photographic officers was undertaken, and also special courses for pilots and observers. For air work two types of cameras were in general use—for obliques the type 18 was used, and for vertical work the L.B.2. Both of these cameras, as might be expected, proved very successful.

Many complications foreign to us in this country arise, due to the heat and humidity experienced, particularly in the early summer months, entailing the use of special cooling tanks and hardening agents. Plates, films, papers, etc., must be kept in airtight cases.

The best conditions for aerial photography are met with in the autumn, winter and spring, the worst being experienced in the months of June, July, August and September, due to the humid—very often over 90 per cent.—and consequently misty atmosphere prevailing during the summer, in which period not much more than 10 per cent. of the days are suitable for practice; this would be less but for the use of special plates and filters.

#### Medical Section

The medical side has in some measure been touched upon when reference was made to the psychology of Japanese pilots. The medical officer had made a special study of aerotherapeutics.

All pilots are, before acceptance, subjected to an examination similar to that in force here, which, as you know, includes a number of special tests. Experience has shown no need for any modification of the standard to which we are accustomed. In the first batch of fifty candidates only one was rejected, and that was solely due to slightly defective vision. The average age was twenty-five—somewhat higher than the ideal.

#### Aeronautical Research in Japan

The Committee for Aeronautical Research was first established in April, 1916, in the Imperial University in Tokyo. This Committee's first task was to make plans for the building of an Aeronautical Institute, which was duly completed and commenced work in August, 1919, but very unfortunately

was almost entirely destroyed by the recent earthquake and the resultant fire.

The directors, professors and assistant professors are appointed by the Minister of Education, and funds for research are provided by the same authority. The Director of the Aeronautical Institute is under the control of the Principal of the University of Tokyo.

The work of the Institute is carried on under twelve sections:—Physics, Chemistry, Metallurgy, Materials, Aerodynamics, Engines, Aircraft, Instruments, Psychology, etc. The general nature of the research done was similar, although, of course, on a smaller scale, to that carried out at the National Physical Laboratory. Research is also carried out at the Naval Air Service Laboratory, Tokyo, and at a similar organisation for the Military Air Service at Tokorozawa. At this latter place remains the only complete wind tunnel in Japan today, as the one at the Aeronautical Institute and the other at the Naval Air Service Laboratory were destroyed with both these establishments during the recent earthquake. All wind tunnels were of the Eiffel type, but there is every reason to believe that an N.P.L. type wind tunnel will be erected in the near future.

It may be mentioned that the one William Froude tank belonging to the Navy was destroyed, the only remaining tank belonging to the Mitsubishi Company.

It will be seen from the above that there is at present little research co-ordination, each Service carrying out its investigations, with consequent overlapping. In certain cases, however, researches of a more general nature have been carried out and the result made public.

Very valuable aeronautical researches are being undertaken at Sendai University, some few hundred miles north of Tokyo. Similar work has been going on in this direction for the last ten years, and has received world-wide attention and appreciation. Original research work has recently been carried out in relation to the electro-magnetic properties of iron and steel alloys. High tensile steels and light alloys are, of course, receiving considerable attention in particular reference to their possible uses in aircraft construction.

At the Central Naval Air Training Station detailed plans have been got out for the building of a fully-equipped full-scale aircraft testing section both for aeroplanes and seaplanes. This would be working in conjunction with a fully-equipped aircraft experimental factory for the production of highly-specialised Service types, not in quantity, but merely for experimental purposes. A speed course, which has already been referred to, has been in operation for some time.

#### Aircraft and Aero Engine Manufacturers in Japan

There are five companies, prominent amongst them being the Mitsubishi Company and the Kawasaki Dockyard Company, Ltd., manufacturing aeroplanes, seaplanes or flying boats. These firms generally manufacture either for the Naval or Military Air Services, but not as a rule for both. In addition to this source of supply a certain number of aircraft are built in the Naval Dockyards and military arsenals.

The machines being manufactured in Japan at the moment are:—The Avro 504 K., 504 L., the F.5, Salmson, Nieuport, and several types of Mitsubishi machines, such as the single-seater fighter, two-seater reconnaissance machine, and the two-seater torpedo carrier. Two machines—the Yokosuka type seaplane and the Nakajima type—both of Japanese design, are also built, the latter in small quantity for commercial uses only.

Many British firms are represented, but only two have undertaken—in one case directly and the other indirectly—construction work, although negotiations are on foot which may add to this number. The two mentioned are Messrs. Short Bros., who built a number of F.5's in Japan, and the Sopwith Aviation Company, or rather the technical staff of the late Company, employed by the Mitsubishi Aircraft Company. In the former case instruction was given to the personnel of the Naval Aircraft Factory in Yokosuka Dockyard in the construction of the F.5. A number of this type have been produced. Assistance has also been given to a company now constructing F.5's for the Naval Air Service. In the latter case, designs were produced to fill the specifications of the Naval Air Supply Section, and when accepted such machines were built under instruction. The single-seater fighter and two-seater reconnaissance machine have been in production for some time. The pioneer work done has been of the utmost value, and it is no exaggeration to say that the above-mentioned concerns have been responsible for laying the foundations of the Japanese aircraft industry on lines which by years of experience and independent world-wide testimony have been proved to be unsurpassed.

Two firms are manufacturing aero engines—the 300 h.p. Hispano-Suiza (French type) and the Le Rhone. The Navy



used to manufacture a few Benz type engines for training seaplanes, and the Army are manufacturing the Salmson. The question of building further engines under licence is receiving immediate consideration.

### Conclusion

I have endeavoured to give you a picture of aviation in Japan, more particularly applied to the Navy, but it has been impossible to go into the many questions involved in any detail, and in fact certain aspects have not been touched on at all, as for example the great interest created by our work, which was inspected by H.I.H. the Prince Regent, H.E. the British Ambassador, and practically all the Japanese naval, military and civil officials of importance.

The policy to be adopted when friendly powers ask for

assistance in the formation or reformation of their air services has been much discussed, but no definite plan seems to have been followed; in fact, violent extremes are found. I venture to submit that had those in authority here in the past been more sympathetic, the sphere of British influence in aeronautical matters could have been vastly extended. Our aircraft and equipment generally continue to prove their superior qualities, the technique of flying is more highly developed here than elsewhere, and our methods of construction ensure the maximum of safety and durability, and it is for these and other reasons that foreign powers turn to us. Should they not, therefore, be welcomed and assisted officially to a reasonable extent, otherwise, they will very naturally seek the aid of other countries more sympathetic to their needs, as has often been the case in the past.

## IMPERIAL AIRWAYS, LTD.

UP to the time of writing no settlement has been arrived at in connection with the dispute between the Imperial Airways, Ltd., and the pilots and ground personnel. In fact the whole position seems to be getting somewhat involved. It appears that, except in the case of the mechanics, the trouble centres round the question of management and operation of the services rather than a matter of better money terms, the pilots complaining that under the new company their right to decide not to fly in bad weather conditions or on machines they feel they cannot trust will be interfered with, to their own and the travelling public's possible danger. So far the company has not issued any definite assurance upon this undoubtedly important point.

Efforts are being made by the Air Ministry to bring about a conference between the parties concerned, as they realise that the interests of civil aviation would be seriously jeopardised by an indefinite stoppage of our air services, which have taken four years to build up.

On Saturday Mr. Robert Williams, Secretary of the National Transport Workers' Federation, sent a letter to the press supporting the claims of the Federation of British Civilian Air Pilots, being, he said, himself an enthusiastic air traveller. He suggested that the Air Ministry and the Labour Ministry would be assisting an industry yet in its infancy by a full and open enquiry into the dispute.

A question on the dispute was asked in the House of Commons on the 7th, and in reply Mr. Leach (Under Secretary for Air) indicated the position of the Air Ministry in the matter. We would refer the reader to our section "In Parliament," appearing elsewhere in this issue, for Mr. Leach's statement, etc.

Early this week a further statement was issued by the Federation of British Civilian Air Pilots, giving a summary of the case of the pilots in the present dispute. It states that the first written offer from the company upon the engagement of the present pilots was not received until on or about March 28. The first proposals provided a basic pay of £100 per annum (and £200 per annum for a few), with flying pay of 2d. per mile. The company was informed immediately that these terms would be entirely unacceptable.

Members of the Federation, the statement says, have hitherto been engaged upon annual contracts, while the new company offer no formal contract and propose terms subject to one month's notice.

"Almost half of the pilots concerned," continues the statement, "have been receiving a basic salary in excess of £500 per annum. Of their own accord and before these negotiations

began they offered to accept a reduction in their pay, bringing it to £500, in consideration of the other pilots being correspondingly raised to that figure, as they were all doing the same work. They also voluntarily decide to accept an increase of only £25 per each additional 500 hours flown, as against the £50 paid by Messrs. Handley Page and the Instone Air Line for each 400 hours flown. . . . On starting for the new company all pilots hitherto employed on this basis will automatically lose the benefit of all flying hours accumulated towards their next increase of pay."

"The terms offered by the new company are in effect considerably less than the general scale previously paid. We ask for £500 per annum basic pay, plus 10s. per hour flown with 200 hours' flying guaranteed per year, and a proper annual contract as before. We also ask that the mechanics who maintain and overhaul the engines and aeroplanes shall be properly paid. The safety of ourselves and the public demands a high state of efficiency of the ground staff."

It is further stated: "Mechanics flying in the machines as 'flying mechanics' (in which capacity they act to a certain extent as assistant pilots) have been receiving flying pay at the rate of 2s. per hour. The new company say this must cease."

The statement concludes in pointing out that both pilots and men say they have no desire to join the service of a company if it contains an element in the management of which they have misgivings; and that they are not on strike, as they have never been employed by the new company and they have no employers—they merely refrain from becoming employees until their pay and conditions of employment are satisfactorily settled and until the organisation is constructed in such a manner as will ensure, as far as possible, their personal safety.

In the meantime we are glad to be able to record that a meeting was held on Tuesday between Sir Eric Geddes, chairman of Imperial Airways, Limited, and the pilots of the Cross-Channel Services. The meeting was restricted entirely to the pilots who were formerly engaged by the three old companies, and lasted for over two hours.

Major Hills, one of the Government directors designate, and Sir George Beharrell, another director of the company, also attended the meeting. A friendly and frank discussion took place, and a further meeting will be arranged. It was agreed, however, that it was in the interests of a settlement of the points at issue that no statement to the Press should be made at this juncture.

### A.N.E.C. Monoplane for Sale

FROM an advertisement appearing in this issue it will be seen that the Addlestone Aeronautical Association has decided to sell the machine which took part in last year's Lympne competitions with such marked success. The machine is the one on which Piercey reached an altitude of 14,400 ft. As we understand the Association is willing to sell at a reasonable figure, there should be an excellent opportunity for some enthusiast to become the owner of a really first-class light 'plane. The performance of the A.N.E.C. is, of course, extraordinarily good, while the fuel economy with the Blackburne engine is all that anyone could ask for.

### A Plymouth-Manchester Air Service

A MEETING was held at the offices of the London Chamber of Commerce on April 3 to consider the suggested Plymouth, Cardiff, Birmingham, and Manchester air service. It was attended by the Director of Civil Aviation, General Sir W.

Brancker, and Colonel Edwards, from the Air Ministry; Major Hemming, of the Aircraft Operating Company; Mr. St. Barbe, of the De Havilland Aircraft Company; and representatives of the Postal Committee of the London Chamber of Commerce, the Plymouth Corporation and Chamber of Commerce, and the Liverpool Chamber of Commerce. After considering in detail the proposed scheme, it was decided to appoint a committee to draw up a scheme for submission to the Air Ministry, though it was realised that under the terms of the agreement between the Government and the Imperial Airways the Air Ministry was precluded from offering financial help to any other body so far as civil aviation was concerned.

### Aerial Fire-Spotters for Canada

A FLEET of 13 aeroplanes has been acquired by the Canadian Government for the purpose of keeping a look out for forest fires. The aeroplane has already proved its efficiency in this kind of work.

# Personals

## Married

JAMES BURNLEY BARRETT, R.A.F., youngest son of Mr. and Mrs. Arthur Barrett, was married on March 25 at St. Mary Abbot's, Kensington, to JOAN MARGARET HEXTALL, youngest daughter of Mr. and the late Mrs. Henry Hyde Hextall, of 24, Cottesmore Gardens, London, W. 8.

Maj. CHARLES ELLIOTT-SMITH, R.A.F., was married on March 28, before the Registrar, St. George's, Hanover Square, to MARGOT, youngest daughter of Mr. F. E. PIFFARD, U.C.S., Bengal (retired).

## To be Married

The marriage between Capt. GUY V. LEATHER, late R.N.A.S., younger son of Colonel and Mrs. Gerard Leather, of Middleton Hall, Belford, Northumberland, and OLIVE, younger daughter of Mr. and Mrs. W. SEALS WOOD, of Johannesburg, will take place at the Cathedral, Johannesburg, on April 16.

The engagement is announced between Flight-Lieut. T. MONTGOMERY, R.A.F.M.S., son of the late Mr. Samuel Montgomery and Mrs. Montgomery, of Parkhall, Antrim, and MARY, only daughter of Mr. ROBERT DARRAGH, J.P., and

the late Mrs. DARRAGH, of 3, Easton Gardens, Cliftonville, Belfast.

The marriage of Air-Marshal Sir JOHN SALMOND to the Hon. MONICA GRENFELL, eldest daughter of Lord and Lady DESBOROUGH, will take place at St. Margaret's, Westminster, on Monday, June 2. Air-Marshal Sir John Salmond will be home from Baghdad this month.

The marriage between Flight-Lieut. F. G. C. WEARE, M.C., and Miss CHERRY-DOWNES will take place at St. Paul's, Knightsbridge, on Wednesday, April 30, at 2.30.

## Killed

Flight-Lieut. KENNETH CROMAR, who was accidentally killed on service on March 11, was the son of Mr. and Mrs. TILMAN, Wallasey. His age was 27.

## Items

Lieutenant Aviateur WILLY COPPENS, Air Attaché at the Belgian Embassy, has left London for Brussels.

Mr. William Leach, M.P., Under-Secretary of State for Air, has appointed Mr. R. J. WILSON, M.P., to be his Parliamentary Private Secretary.

## UNVEILING OF "R. 38" MEMORIAL

THE memorial to the British and American officers and airmen and others who lost their lives in the airship "R.38" will be unveiled by Air Vice-Marshal Sir Vyell Vyvyan, K.C.B., D.S.O., Air Officer Commanding Coastal Area, Royal Air Force, and dedicated by the Lord Bishop of Hull, assisted by the Reverend H. D. L. Viener, C.B.E., M.A., K.H.C., Chaplain-in-Chief to the Royal Air Force, and by the Reverend W. Moffat, M.A., B.D., Staff Chaplain, Royal Air Force, in the Western Cemetery, Hull, at 3.15 p.m., on Friday, this week, April 11.

The memorial, which has been subscribed for by individual officers and airmen of the Royal Air Force and others interested, was designed by Major Winton Newman, F.R.I.B.A., and executed by Mr. Wigglesworth of Hull. It is in the form of a Celtic cross in Portland stone, about 16 ft. high, with two bastions on either side. There is a bronze plaque on the left bearing the names of the British officers and airmen;

on the right is a similar plaque with the names of the American officers and airmen, and in the centre a dedicatory bronze with the following inscription:—

TO THE GLORY OF GOD  
AND IN MEMORY OF OFFICERS AND MEN  
OF THE  
ROYAL AIR FORCE  
AND OF THE  
RIGID AIR DETACHMENT  
UNITED STATES NAVY.  
MEMBERS OF THE STAFFS  
OF THE  
NATIONAL PHYSICAL LABORATORY  
AND OF THE  
ROYAL AIRSHIP WORKS.  
LOST IN AIRSHIP R.38 (Z.R.2)  
AUGUST 24TH, 1921.

## French Government Air Prizes for 1924

SOME substantial prizes are being offered by the French Government for air events this year, mainly with the object of maintaining or recovering French world's aviation records. They comprise the following:—

140,000 francs to the constructor of a French aeroplane which restores to France the world's speed "record," and 60,000 francs to the constructor of the engine.

100,000 francs to the constructor of a French machine which recovers for France the world's speed "record" for seaplanes, and 50,000 francs to the constructor of the engine.

50,000 francs to the constructor of the French aeroplane which recovers for France the world's distance "record," with an additional 50,000 francs if the world's duration "record" is beaten at the same time. The constructor of the engine will receive 50,000 francs, with an additional 20,000 francs if the two "records" are simultaneously beaten.

If the existing world's altitude "record" for aeroplanes is beaten in France, once or several times before the end of 1924, a prize of 25,000 francs will go to the French constructors who hold the world's "record" on December 31, 1924. A similar prize will be offered for seaplanes. If in the course of the competition for the Beaumont Cup certain speed "records" other than existing world's "records" are beaten a prize of 15,000 francs will be gained by the French constructor of the machine with which the "record" was beaten, with 5,000 francs to the constructor of the engine.

## Hendon an R.A.F. Station?

WE understand that negotiations are proceeding between the Grahame-White Company and the Air Ministry with a view to the latter taking over the London Aerodrome, Hendon, and using it as an R.A.F. air station. Besides being the headquarters of at least one regular flying squadron and one Territorial unit, Hendon station, if it comes into being, will

also play an important part in the aerial defence of London scheme. It is to be hoped that this proposal, should it materialise, will not prevent the holding of any civil flying events at this familiar and, we think, popular aviation centre—especially in view of the fact that the "Tube" will very shortly have a station outside the aerodrome, thereby enabling Londoners to get to and from the aerodrome with the greatest possible ease.

## Turkish Air Mission's Visit

A TURKISH aeronautical mission is now in London with the object of visiting Royal Air Force stations and making a general study of the British system of air administration and development. Colonel Muzafer Bey is at the head of the mission, which is being assisted in its task by an officer of the Air Ministry.

## Round Australia Flight

WING-COMMANDER GOBLE and Flying Officer McIntyre left Melbourne at dawn on Sunday, April 6, flying a Fairey seaplane, for a 9,000-mile flight round Australia, the object of which is to obtain a survey of the coast for defence purposes, aircraft bases, and collect data in connection with the effect of tropical conditions on aircraft. After a journey of 10 hrs. 20 mins. they completed the first stage of their tour on reaching Sydney.

## British Air Mission's Visit to France

NINE "D.H.9" machines conveyed the British Air Mission, which has been invited to make a tour of inspection of the French military aviation centres, to Le Bourget on April 6. The Mission, under the command of Commodore Brooke-Popham, and consisting of seven officers, was received on arrival by General Dumesnil, Director of French Military Aeronautics, and Squadron-Leader Sewell, British Air Attaché in Paris.



# THE ROYAL AIR FORCE

London Gazette, April 1, 1924

## General Duties Branch

Flight-Lieut. G. S. N. Johnston is granted a permanent commission in the rank stated; April 2. F. E. Watts is granted a permanent commission as a Pilot-Offr., with effect from March 24 and with seniority of September 24, 1922. The following are granted short service commissions as Flying-Offrs., with effect from and with seniority of dates indicated:—R. L. Bateman; March 18. E. R. Maddox, M.C.; March 25.

The following Pilot-Offrs. are promoted to rank of Flying-Offr.:—C. E. N.

Guest, D. G. Pinnell, A. Malone, F. R. D. Swain, A. M. Rowe; February 21. W. C. Venmore; March 2. A. J. Peacey, B. N. Murgatroyd, O. B. Swain, W. H. Phillips, J. H. G. Franklin, T. J. Woods; April 2. Flying-Offr. H. R. Tyler resigns his short service commission; April 2.

## Stores Branch

The following Pilot-Offrs. on probation are confirmed in rank and are promoted to rank of Flying-Offr.; December 5, 1923:—C. G. Bull, E. F. Colman, C. P. Puckridge, C. B. Rawlins, F. C. Warner. Pilot-Offr. on probation W. R. Donkin is confirmed in rank; December 5, 1923.

## ROYAL AIR FORCE INTELLIGENCE

**Appointments.**—The following appointments in the R.A.F. are notified:—

### General Duties Branch

**Squadron Leaders:** N. H. Bottomley, A.F.C., to R.A.F. Depot, on transfer to Home Estab.; 16.3.24. F. H. M. Maynard, A.F.C., to R.A.F. Depot, on transfer to Home Estab. 18.3.24. J. S. T. Bradley, O.B.E., to H.Q., Iraq. 31.1.24.

**Flight Lieutenants:** W. H. E. Kemp, A.F.C., to No. 84 Sqdn., Iraq. 2.3.24. A. Chapman, to H.Q., Iraq. 2.3.24. D. W. King, to No. 2 Armoured Car Co., Palestine. 1.12.23. M. Moore, to H.Q., Egypt. 12.3.24. G. H. Martingell, A.F.C., to No. 70 Sqdn., Iraq. 17.3.24. J. L. M. de C. Hughes-Chamberlain, to H.Q., India. 12.3.24. J. E. MacLennan, to No. 8 Sqdn., Iraq. 7.3.24. R. S. Sorley, D.S.C., D.F.C., to Marine Aircraft Experimental Estab., Felixstowe. 8.4.24. E. G. Hilton, A.F.C., to No. 58 Sqdn., Worthy Down. 1.4.24. G. Martyn, to No. 9 Sqdn., Upavon. 1.4.24. W. H. Markham, to No. 99 Sqdn., Netheravon. 1.4.24. T. O. Clogstoun, to No. 58 Sqdn., Worthy Down. 1.4.24.

**Flying Officers:** H. H. S. Scott, D.S.M., to Inland Area Aircraft Depot, Henlow; 29.3.24. F. Simpson and R. C. Higgins, to Air Ministry; 8.4.24. A. F. McC. Riggs, to No. 24 Sqdn., Kenley; 1.4.24. A. Haines, to R.A.F. Depot, on appointment to a Short Service Comm.; 27.3.24. M. W. Nolan, to No. 3 Sqdn., Manston. 1.4.24. G. W. Birkinshaw, to No. 17 Sqdn., Hawkinge. 1.4.24. J. Parsons, to No. 2 Armoured Car Co., Palestine. 1.12.23. A. Page, to Aircraft Depot, Egypt. 1.2.24. H. A. Anson, to H.Q., Iraq. 20.8.23. A. E. Woodbridge, C. E. Barraclough and B. C. Duke, to No. 58 Sqdn., Worthy Down. 1.4.24. C. A. Horn, M. W. J. Boxall, H. C. Davies and J. N. D. Anderson, to No. 9 Sqdn., Hawkinge. 1.4.24. F. W. Barkley, F. E. W. Davis, F. W. Mundy and R. B. Fleming, to No. 99 Sqdn., Netheravon. 1.4.24.

**Pilot Officers:** R. D. Lawson, to No. 24 Sqdn., Kenley; 1.4.24. R. H. Bibby, to No. 17 Sqdn., Hawkinge. 1.4.24. V. J. Hatton and H. R. F. Baxter, to No. 99 Sqdn., Netheravon. 1.4.24. B. L. Young, F. F. W. Hall and E. S. C. Davis, to No. 58 Sqdn., Worthy Down. 1.4.24. J. W. New and E. A. McKinley-Hay, to No. 9 Sqdn., Hawkinge. 1.4.24.

## IN PARLIAMENT

### Royal Navy Aircraft Carriers and Singapore Docks

VISCOUNT CURZON, on April 2, asked the Parliamentary Secretary to the Admiralty whether the following aircraft carriers, His Majesty's ship *Eagle*, His Majesty's ship *Furious*, His Majesty's ship *Hermes*, His Majesty's ship *Argus*, and, when reconstructed, His Majesty's ship *Glorious* and His Majesty's ship *Courageous*, can make use of the existing docking accommodation at Singapore if necessary?

Mr. Ammon: His Majesty's ship *Eagle* cannot use the existing docking accommodation at Singapore. The King's Dock can take all the other aircraft carriers mentioned by the noble lord, including His Majesty's ships *Glorious* and *Courageous*, after they have been reconstructed.

VISCOUNT CURZON: May I apologise to the hon. gentleman for saying that he made an incorrect statement to the House on the Navy Estimates in this connection? I offer an unreserved apology.

### Imperial Airways, Ltd., Dispute

MR. B. SMITH asked the Under-Secretary of State for Air whether his attention had been drawn to the suspension by Imperial Airways, Ltd., of the air service previously maintained by the Handley Page, Daimler and Instone Companies; whether, in the interests of civil aviation and the safety of the public, he will take immediate action to remove the source of this dissatisfaction and also arrange that the skilled pilots shall have a voice in saying whether in certain conditions flying can be undertaken in safety?

Mr. Leach: The answer to the first part of the question is in the affirmative. As regards the second part, my noble friend has been in personal communication with the parties to the dispute, and he and I are ready to do all in our power to facilitate a settlement, but the various questions which have arisen are primarily matters for negotiation between the parties concerned. As regards the last part of the question, I hope that a satisfactory arrangement will be reached upon this and the other questions upon which the parties are at present in disagreement.

Mr. Smith: Is the hon. gentleman aware that the management which is now imposed on airman having as much as 28 hours' flying time in four days, and is not that a danger to the public?

Mr. Leach: That is one of the matters, I suppose, which are in dispute.

### Aircraft Disposals Company (Sales)

MR. MACLEAN on April 3 asked the Home Secretary whether the Aircraft Disposals Syndicate has for disposal 2,000 complete aeroplanes, 10,000 aeroplane engines (new), and 8,000 Vickers and Lewis machine guns (air type); whether he is aware that several parties are endeavouring to purchase these armaments; and whether, before they are allowed to be sold or leave the country, he will insist upon guarantees as to their destination and that they will not be used for illegal purposes?

Mr. Graham: I have been asked to reply. I understand that the Aircraft Disposals Company purchased large quantities of aircraft, including 'planes and engines, from the Government, and the company are reselling that material. I have no information as to the quantities remaining for sale or as to what negotiations, if any, are proceeding between the company and other parties. As regards the machine guns mentioned, the company are only allowed to sell these after full particulars of their proposed sale have been furnished to the Government and the Government are satisfied as to the propriety of the sale.

### Air Service Dispute

MR. B. SMITH on April 7, upon the adjournment, speaking in regard to the dispute between the Imperial Airways, Ltd., said according to an agreement entered into by the previous Government, in December, 1923, with the

British, Foreign and Colonial Corporation, giving a ten years' monopoly there was the following Clause: "That the company shall operate the Air Services by not later than April 1, or run the risk of cancellation of the agreement." I want to bring to the notice of the House that April 1 is now past, and not a single flight has been taken, owing to the fact that not a single airman has been re-engaged, and the lower grades of groundsmen have also been stood over for the period ending March 31. I do not know whether we are in order in saying that the agreement is cancelled or otherwise. These men were in receipt of salaries varying from £500 to £550, with 10s. per hour flying time. An intimation was made to them that the company was to pay them £100 a year and 2d. a mile for the distance flown. We have two directors upon this management. The Air Ministry has been approached and so has the Minister of Labour, but the latter Minister feels he cannot call them together without infringing some rules of etiquette in the Air Ministry, and therefore this Ministry can do nothing. Not a single machine has flown since the end of last week, and foreign machines are now using the grounds at Croydon to the detriment of our service. I want to say frankly that these men, who have given long years of service, feel that they ought to come under a safe and sound management and a just one, and they feel they will not get these advantages under the present management. Secondly, the air mechanics who fly with these men have to fly at a rate of £2 19s. 6d. a week, and no additional rate. We have nothing to fear in civil aviation. Given co-operation and moral support, this country could have the finest civil aviation in the world. The men are here. They have the ability, but it will never remain with them unless they get that hearty sympathy and co-operation that are essential to the development of the service.

Mr. Leach: I am not in a position to make any new statement regarding this unhappy dispute. It is the fact that the Air Ministry is not the employer of the people concerned in the dispute. True, we are to have two directors on the new company, but they have not yet taken their seats, and are not to do so until the allotment has been made. The Secretary of State for Air and I have interviewed both sides to this dispute, and not being directly concerned, we have to take a neutral attitude. We could not very well do otherwise. We have offered to both sides our good offices for the furtherance of a settlement. We are as deeply concerned that a settlement should be reached as anyone could be. That offer so far does not seem to have been accepted, because we have not heard directly from either side with regard to the dispute. The Air Ministry is very anxious to secure this settlement, and I repeat the offer of the Ministry of its services as mediator. Should that offer be accepted we shall utilise whatever chance presents itself to us for a settlement.

Mr. Smith: Is the Under-Secretary prepared to exercise the powers under the Sir Samuel Hoare agreement which compel them to commence operations on April 1, and if in fact they have not yet taken over the control or brought out the existing company?

Mr. Leach: I am not clear that the company has broken as yet any part of the agreement upon which the company has come into existence. Should that be the case, it may well be that the Ministry will take steps in the matter.

Major-General Sir Frederick Sykes: I have only a minute, but I do ask that something should be done in order to bring together the two parties in this dispute. It is so important, not only from the point of view of the country, but from that of civil aviation as a whole, that this dispute should be settled. With regard to the constitution of the Board of the company, there is no doubt that the company has not at present got anybody on the board who has flown a great deal in the air, and, therefore, is in sympathy with the employees, whether pilots or air mechanics, of the company itself. I hope the matter can be settled, and will be settled, to the advantage of the country as a whole.

## AIR SERVICES RE-UNIONS AND FUNCTIONS

Announcements for this column are invited, and inserted without charge.

April 26.—28th Squadron (R.A.F.) Old Boys' Association. The social evening, comprising a whist drive and dance, which was to have been held in connection with the above association at Shearn's Restaurant, 131, Tottenham Court Road, W. 1, on March 29 last, has been postponed—owing to the recent tram strike, etc.—to April 26, commencing at 6 p.m. sharp. Tickets (including refreshments, 3s. single, 5s. 6d. double) may be obtained from C. T. Hodges, Hon. Secretary, 102,

Camden Street, N.W. 1, who would be glad to get into touch with any of the "Old Boys" of above squadron and to welcome such members at any and all times.

### R.A.F. Pilot Killed

PILOT OFFICER JACK HAMILTON PLEDGER, of the Officers' Training School, Netheravon, was killed at West Kennett, near Marlborough, on April 4. Whilst flying at a height of 1,000 ft. the machine caught fire and then dived into a bank by the roadside. The pilot was thrown out of the machine and killed.

## International Air Congress Report (1923).

THE Report on the proceedings of the International Air Congress (1923), which has just been published, is undoubtedly a work of some considerable value to all connected with aeronautical matters. Not only is it a record of the very interesting and important papers read during the sittings of the Congress—all of which are printed in full—but the discussions which followed these papers are also given. The list of Members and Associate Members, given in the commencement of the Report, also makes interesting study. This list shows a total of 551 distributed amongst 21 nations—Great Britain heading the list with a total of 383.

## Two French Airmen Killed

ON March 29, two French military airmen, Sergeant Leverage and Private Jouvart, were killed at Cazeaux training ground, as a result of their machine suddenly nose-diving to earth.

## Skywriting Patents in America

THE first action brought by the Skywriting Corporation of America against an infringer, has been decided in favour of the above company. The suit was against Rogers Aircraft, Inc., and certain individuals in respect of infringing flights performed on the Pacific Coast. The case was tried in the District Court of the U.S. District of California, on December 11, 1923, and by a ruling handed down on February 27 of this year, the court sustained Patent No. 922-709 and granted a permanent injunction and damages against the defendant. The Court ruled that this patent secured to the Skywriting Corporation "the monopoly of any sort of signalling or skywriting from an aerial machine by means of the use of colouring matter, the output and deposit of which, and, therefore, the visibility of which, is controlled and determinable by a valve operated in accordance with some predetermined purpose." The Skywriting Corporation owns a number of other patents covering both method and apparatus employed in skywriting.

## Lisbon-Macao Flight

TWO Portuguese military airmen, Captain Brito Paia and Lieutenant Sarmiento Beires, left Amadora, near Lisbon, on April 2 in the Breguet biplane "Patria," for Macao, and arrived safely at Villa Nova de Milfontes. The route to be taken is *via* Villa Nova de Milfontes, Oran, Kairawan, Gabes, Tripoli, Benghazi, Cairo, Damascus, Baghdad, Basra, Bander Abbas, Karachi, Delhi, Calcutta, Rangoon, Bangkok, Hanoi, Canton, and Macao. They left Villa Nova de Milfontes on Monday, April 7.

## 1924 Gordon-Bennett Balloon Race

So far 18 balloons have been entered for this year's Gordon-Bennett Balloon Race, which takes place on June 15. They will be represented as follows:—

Belgium .. .. .	3
England .. .. .	2
France .. .. .	3
Italy .. .. .	2
Spain .. .. .	3
Switzerland .. .. .	2
U.S.A. . . . .	3

## D. Napier and Son, Ltd.

THE directors in their report to September 30, 1923, state that the year's trading (after providing for depreciation, interest, taxation, directors' and trustees' fees, manager's commissions and contingencies, shows a profit amounting to £98,448 10s. 6d., and with the added balance brought forward of £7,953 8s. 6d., makes a total of £106,401 19s. After deducting preference dividend paid on preference shares at 7½ per cent. per annum for the 12 months ended June 30, 1923, £22,500, there remains £83,901 19s., which the directors recommend shall be appropriated as follows:—To replace to general reserve the amounts taken therefrom in the year 1920, £22,500; in the year 1922, £50,000, leaving a balance to carry forward of £11,401 19s.

It will be seen from the accounts that during the year under review the business of the company has considerably improved. There was an increase in sales both of Napier cars and aero engines.

The 1,000 h.p. Napier aero engine known in the Royal Air Force as the "Cub," has successfully completed the strenuous British Government type test. This is the highest powered aero engine to have passed such a test, and it is acknowledged to be an important achievement for British engineering, as well as for this company in particular.

Important developments in connection with the company's productions are in progress.

A highly satisfactory document for the shareholders, upon which the directors are to be heartily congratulated.

## SOCIETY OF MODEL AERONAUTICAL ENGINEERS

### Competition for Self-Righting Model Aeroplanes

AT a meeting of the Research Committee held at 20, Thurlby Road, Wembley, on April 1, the rules for this competition were drafted and, subject to the approval of the donor of one of the prizes, will be published next week. The ingenuity of members will be rewarded to the extent of prizes value 3½ guineas.

Those interested should order now a copy of next week's FLIGHT for full details and rules. The competition will be fixed for one Saturday in September, so members have ample time in which to cudgel their brains.

W. E. EVANS,

Hon. Sec., Research Committee

## NEW COMPANY REGISTERED

IMPERIAL AIRWAYS, LTD., was registered on March 31, with a nominal capital of £1,000,000, in £1 shares. The objects are: to acquire (on such terms as the President of the Air Council shall in writing reasonably approve) the businesses heretofore carried on by (1) the Handley Page Transport, Ltd., (2) the Instone Air Line, Ltd., (3) the Daimler Hire, Ltd., and (4) the British Marine Air Navigation Co., Ltd., as aerial transport companies, or, in default of such acquisition, to establish an air transport service to operate equivalent services; to enter into an agreement with the President of the Air Council in accordance with the draft contained in the White Paper dated December 22, 1923, signed by Sir Samuel Hoare, to manufacture, repair, buy and sell balloons, aeroplanes and airships of all descriptions, etc.

The number of directors is not to be less than three nor more than ten. During the continuance of the agreement above referred to, the President of the Air Council may appoint two "Government" directors.

Qualification (except "Government" directors): £500 shares.

Remuneration: £6,500 per annum (which sum may be increased by the company in general meeting) divided between them.

During the continuance of the said agreement, the profits available for distribution in each year are to be dealt with as follows:—

(a) A sum equal to 10 per cent. on the paid-up capital to be set aside for dividends; (b) the balance to be divided into three equal parts, the first to be applied in or towards repayment to the President of the Air Council of the yearly subsidies mentioned in the said agreement, the second to be applied in the development and improvement of the air service to be provided by the company and the development of British civil air transport, or either of them, and the third to be set aside and be available for distribution among the shareholders.

No person may become or remain a member of the company who is not a British subject, and no corporation may become a member unless it is incorporated under the laws of the United Kingdom, or some other part of the British Empire.

The directors may borrow up to the amount of the nominal capital for the time being without the sanction of a general meeting. Solicitors: Clifford Turner and Hopton, 81-7, Gresham Street, E.C.

## AERONAUTICAL PATENT SPECIFICATIONS

Abbreviations: cyl. = cylinder; I.C. = internal combustion; m. = motor. The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

### APPLIED FOR IN 1922

Published April 10, 1924

- 33,768. E. H. M. E. DURAND. Four-stroke cycle I.C. engines. (190,173.)  
33,904. G. P. OTTINO. Aeronautical machines. (212,626.)  
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